This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

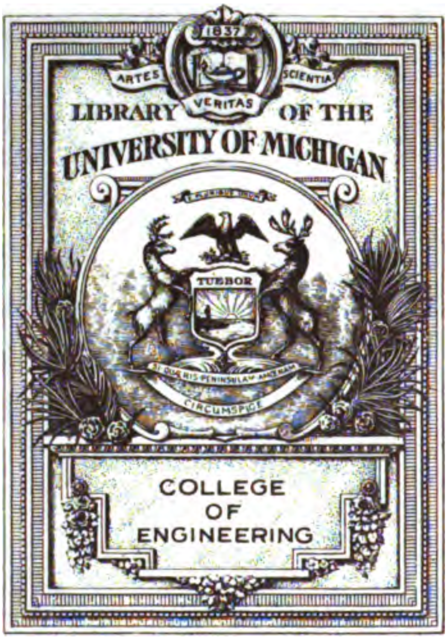
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B 426786



LIBRARY OF THE
UNIVERSITY OF MICHIGAN

COLLEGE
OF
ENGINEERING

GENERAL
LIBRARY

TA
23
A3

ANNUAL REPORTS, WAR DEPARTMENT
FISCAL YEAR ENDED JUNE 30, 1918

U.S. [illegible]

REPORT OF THE CHIEF OF ENGINEERS U. S. ARMY

1918

IN THREE PARTS

PART 3

WASHINGTON
GOVERNMENT PRINTING OFFICE
1918

REPORTS OF
DISTRICT ENGINEERS

ACCOMPANYING THE ANNUAL REPORT OF THE CHIEF OF
ENGINEERS, U. S. ARMY

FOR THE

FISCAL YEAR ENDED JUNE 30, 1918

(CONTINUED)

334255

IMPROVEMENT OF RIVERS AND HARBORS IN THE LOS ANGELES, CAL., DISTRICT.

REPORT OF CAPT. CHARLES T. LEEDS, U. S. ARMY, RETIRED.

IMPROVEMENTS.

1. Colorado River, Ariz........... 3317
2. San Diego Harbor, Cal......... 3317
3. Los Angeles Harbor, Cal........ 3319
4. San Luis Obispo Harbor, Cal... 3323

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT SEE PAGES 1655 TO 1670.

1. COLORADO RIVER, ARIZ.

OPERATIONS DURING THE FISCAL YEAR.

No work was done.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

No commerce.

APPROPRIATIONS.

July 5, 1884.................	$25,000.00	Returned to surplus fund of Treasury.................	$218.25
July 13, 1892...............	10,000.00	Net total..............	53,781.75
July 27, 1916...............	14,000.00		
March 4, 1913 (allotted Aug. 17, 1918..................	5,000.00		
Total.................	54,000.00		

2. SAN DIEGO HARBOR, CAL.

OPERATIONS DURING THE FISCAL YEAR.

No work was done. Proposals for widening the approach (area B) to the municipal pier at San Diego, by dredging areas A and C (south and north, respectively, of area B), and the middle ground channel, were opened November 3, 1917, and after readvertisement on March 21, 1918. In both cases all bids were rejected as excessive, and in the latter case, also on account of the delay in the proposed time of beginning work. Several informal proposals for doing this work by contractors' plant under lease or under contract have been received. The amount of money expended for this purpose, including office expenses, was $342.78. Pending decision as to the most economical method of doing the work, the U. S. dredge *San Pedro*, purchased for work at Los Angeles Harbor, is being overhauled and repaired for use at San Diego. This work began May 20 and was

in progress at the close of the fiscal year. Surveys were made
the middle ground channel and in connection with the modificatic
and extension of the harbor lines. The amount of money expende
on this work, including office expenses, was $851.78. Authority w
received to increase the estimates of cost for dredging area C fro
$220,000 to $380,000 and for dredging area A from $85,000 t
$130,000. These increases were necessary not only because of th
great rise in cost of labor, fuel, and dredging plant material, bu
also because the original estimates were based on 3 feet more of cu
than authorized and on the assumption that the city of San Dieg
would receive and impound the dredged material. No area pro
tected by bulkheads is available for the deposits of the material an
the city of San Diego has stated its inability to pay the cost of im
pounding the dredgings.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Open entire year.

[Furnished by chamber of commerce of San Diego County.]

Vessel classification.

Classes.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Registered:					
Steamers	425	9	434	538,803	31,231
Motor boats	91	97	188	11,525	1,861
Unrigged	30	....	30	22,872	....
Total	546	106	652	573,200	33,092

Freight traffic.

Articles.	Short tons.	Value.
INBOUND TRAFFIC.		
Foreign imports:		
Copper ore	698	$122,590
Beans	253	31,315
Grain	1,180	103,760
Guano	1,802	47,492
Magnesite	5,742	143,550
Miscellaneous	2,762	592,368
Total	12,437	1,041,075
Coastwise:		
Coal	73,615	1,192,455
Fish	16,190	1,326,080
Kelp	293,535	381,596
Lumber	111,483	1,114,863
Oil, crude	451,215	2,464,185
Poles	1,435	14,350
Piling	1,739	17,400
Miscellaneous	86,456	10,873,826
Total	1,035,668	17,384,755

Freight traffic—Continued.

Articles.	Short tons.	Value.
OUTBOUND TRAFFIC.		
Foreign exports:		
Autos	6	$6,300
Brick	361	6,627
Coke	801	10,312
Coffee	32	12,136
Lumber	3,053	30,534
Machinery	13	8,166
Sugar	82	13,056
Miscellaneous	1,222	404,255
Total	5,570	491,386
Coastwise:		
Canned goods	594	92,291
Fish	3,323	269,276
Lemons	1,183	177,465
Rubber goods	79	77,218
Soap powder	1,959	255,548
Miscellaneous	7,718	1,468,405
Total	14,856	2,335,203
Grand total	1,068,531	21,252,419

APPROPRIATIONS.

Total prior to adoption of present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 548)		$840,350.00
Present project:		
Mar. 4, 1913	$243,786.00	
July 27, 1916	220,000.00	
Aug. 8, 1917	174,000.00	
		637,786.00
Total		1,478,136.00

Receipts from sales, etc., $0.50.

3. LOS ANGELES HARBOR, CAL.

OPERATIONS DURING THE FISCAL YEAR.

(*A*) *Outer harbor.*—No work was done by the United States. On November 1, 1917, the steamer *Governor* rammed the breakwater from the ocean side about 2,000 feet from the outer end, displacing a number of stone. The owners of the steamer, the Pacific Steamship Co., have made the necessary repairs. The $76.99 expended during the year was for inspection of this work.

(*B*) *Inner harbor.*—The U. S. dredge *San Pedro* and attendant floating plant was under care of watchmen from the beginning of the year up to May 20. The amount thus expended was $1,686.25. At that time the work of overhauling and repairing the dredge was begun. At the end of the fiscal year this work was not yet complete. When complete, it is proposed to lease the dredge to the appropriation, "Harbor at San Diego, Cal.," for work at that harbor. The amount expended on this work was $1,026.91. Negotiations were in progress between the harbor commission of the city of Los Angeles and the Los Angeles and Salt Lake Railroad Co. for the acquirement of the land necessary for widening the main channel to 1,000 feet. It is believed that an agreement will be reached at an early date.

(*C*) *Diversion of silt from Los Angeles and Long Beach Harbors.*—During the year the Los Angeles County flood control district submitted a form of agreement which they propose to enter into to meet the conditions set forth in House Document No. 462, Sixty-fourth Congress, first session. This form of agreement was approved by the Secretary of War March 7, 1918, and was returned to the flood control district on March 18, 1918, for execution, but such action has not yet been taken. The Capital Issues Committee has authorized the flood control district to sell bonds for the acquirement of the right of way and the construction of the necessary roads, bridges, etc. These bonds have not yet been sold. Negotiations are in progress for the acquirement of the necessary right of way.

An increase from $626,000 to $1,175,000 was authorized in the estimated cost for widening the main channel. This increase was necessary not only because of the great rise in cost of labor, fuel, and dredging plant material but also because of an increase of about 355,000 cubic yards in the amount to be dredged, due to the substitution of long chords for the convex curve which marks the easterly boundary of the proposed channel, and the increased distance that the dredged material must be pumped on account of the structures that were built on the proposed deposit ground subsequent to the date of the original estimate.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Open entire year.

[Furnished by board of harbor commissioners, Los Angeles, Cal.]

Vessel classification.

Classes.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Registered steamers	572	23	595	1,072,670	288,917
Unregistered steamers	1,738		1,738	1,198,233	
Total	2,310	23	2,333	2,270,903	288,917

Freight traffic.

Articles.	Short tons.	Value.
INBOUND TRAFFIC.		
Foreign imports:		
Beans	9,198	$1,654,600
Flour	6,594	723,890
Groceries	1,066	83,040
Hardwood	355	17,725
Lumber and lumber products	8,366	160,560
Merchandise	8,559	818,950
Ore and antimony ore	1,877	303,270
Rice	128	12,240
Wood pulp	743	24,855
Total	36,886	3,799,130

Freight traffic—Continued.

Articles.	Short tons.	Value.
INBOUND TRAFFIC—continued.		
Coastwise:		
Automobiles and supplies	1,062	$1,032,890
Bags, burlap, and cotton	1,187	138,640
Beans	2,155	418,600
Beet pulp	62	6,015
Bran, feed, meal, and mill feed	9,564	386,040
Butter and cheese	1,580	648,400
Canned fish	2,911	679,725
Canned fruit	1,449	188,340
Canned goods	5,680	504,100
Canned milk	7,171	787,390
Chocolate	667	341,050
Clothing and dry goods	207	414,000
Coffee, green and roasted	3,225	1,059,300
Drugs and chemicals	2,268	218,635
Flour	31,415	2,660,240
Fresh fruits and vegetables	4,266	291.250
Grain	17,681	939,818
Groceries	8,323	1,061,040
Iron and steel	826	82,324
Liquors	3,089	780,090
Lumber and lumber products	934,689	15,188,656
Merchandise	84,154	18,057,277
Oil, refined	14,661	586,440
Paints, oils, and varnish	1,554	134,404
Paper	29,197	5,675,830
Poultry food and supplies	1,972	152,310
Rice	9,038	920,840
Soap	650	78,126
Sauce, table	386	77,200
Sugar	14,956	2,253,450
Total	1,196,045	55,762,420
From Hawaii:		
Automobiles	18	14,400
Fruits and vegetables	182	17,600
Merchandise	54	2,310
Pine apples, fresh, canned and juice	466	47,350
Total	720	81,660
Total inbound	1,233,651	59,643,210
OUTBOUND TRAFFIC.		
Foreign exports:		
Automobiles	69	55,200
Cement	1,056	6,752
Dry goods	22	44,000
Fruits and vegetables	1,895	111,770
Groceries	254	71,000
Iron and steel	490	39,725
Merchandise	6,300	2,153,069
Oil—		
Fuel	310,925	1,796,912
Refined	8,652	346,080
Total	329,663	4,624,508
Coastwise:		
Automobiles and supplies	1,412	1,319,260
Bags, burlap, and cotton	349	38,410
Beans	1,503	357,750
Beet pulp	3,455	98,697
Bran, feed, meal, and mill feed	1,945	93,595
Canned fish	1,943	420,160
Canned fruit	1,172	148,850
Canned goods	2,239	197,870
Clothing and dry goods	216	432,000
Drugs and chemicals	423	35,940
Electrical goods	242	242,000
Flour	319	32,850
Fresh fruits and vegetables	20,699	1,244,950
Grain	4,266	210,165
Groceries	5,864	1,410,465
Iron and steel	4,070	348,940
Liquors	809	102,772
Merchandise	31,025	8,010,128
Oil—		
Fuel	707,245	5,513,318
Refined	47,857	405,638

Freight traffic—Continued.

Articles.	Short tons.	Value.
OUTBOUND TRAFFIC—continued.		
Coastwise—Continued:		
Paints, oils, and varnish	644	$87,680
Paper	416	63,164
Poultry food and supplies	2,600	106,741
Rice	105	11,705
Soap	3,564	395,925
Sugar	214	32,100
Total	844,596	23,361,103
To Hawaii:		
Automobiles	32	25,600
Clothing and dry goods	20	52,000
Fruits and vegetables	209	16,960
Furniture, carpets, and rugs	21	3,600
Groceries	66	8,130
Hardware and plumbers' supplies	19	10,300
Merchandise	580	60,320
Paper	101	29,140
Soap	88	8,800
Total	1,136	214,850
Total outbound	1,175,395	28,200,461
Grand total	2,409,046	87,843,671

APPROPRIATIONS.

FOR OUTER HARBOR.

Total prior to adoption of present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 479)		[1] $3,049,000
Present project:		
July 25, 1912	$327,250	
Oct. 2, 1914 (allotted Nov. 16, 1914)	10,000	
		337,250
Total		[1] 3,386,250

FOR INNER HARBOR.

Total prior to adoption of present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 479)		$1,638,000
Present project:		
June 25, 1910	$400,000	
Feb. 27, 1911	270,000	
July 25, 1912	25,000	
Mar. 4, 1913	121,000	
Oct. 2, 1914 (allotted Oct. 7, 1914)	42,000	
Mar. 4, 1915 (allotted Apr. 1, 1915)	75,000	
July 27, 1916	75,000	
Aug. 8, 1917	75,000	
July 18, 1918	434,350	
		1,517,350
Total		3,155,350

FOR SILT DIVERSION.

July 27, 1916	500,000
Grand total	7,041,600

Receipts from sales, etc., $661.74.

---

[1] $29,000 transferred to other works under authority of the river and harbor act approved Mar. 4, 1915.

4. SAN LUIS OBISPO HARBOR, CAL.

OPERATIONS DURING THE FISCAL YEAR.

No work was done, the project having been completed.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

[Furnished by the Pacific Coast Railway Co.]

Season of navigation, year 1917: Open entire year.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered steamers	58	86,304
Unregistered steamers	911	1,355,568
Total	969	1,441,872

Freight traffic.

Articles.	Short tons.	Estimated value.
INBOUND TRAFFIC.		
Coastwise:		
General merchandise	21	$6,720
Lumber	918	159,084
Manufactured iron and steel	19	3,800
Shingles	77	1,926
Sugar	7	1,120
Building material	5	300
Produce	1,042	62,520
Total	2,089	235,470
OUTBOUND TRAFFIC.		
Foreign exports: Oil, crude	338,434	2,216,743
Coastwise:		
Asphaltum	19	48
Oil, crude	2,128,216	13,939,815
Oil, refined	1,298	46,404
Total	2,129,533	13,986,267
Grand total	2,470,056	16,438,480

APPROPRIATIONS.

Aug. 11, 1888	$25,000.00
Sept. 19, 1890	40,000.00
July 13, 1892	30,000.00
Aug. 18, 1894	40,000.00
June 3, 1896	40,000.00
Mar. 3, 1899	55,000.00
June 13, 1902	50,000.00
Mar. 3, 1905	25,000.00
Mar. 2, 1907	$63,660.00
May 27, 1908	60,000.00
Mar. 4, 1909	30,000.00
Mar. 4, 1911	64,000.00
June 23, 1913	46,000.00
Total	568,660.00

Receipts from sales, etc., $3.45.

IMPROVEMENT OF RIVERS AND HARBORS IN THE FIRST SAN FRANCISCO, CAL., DISTRICT.

REPORT OF COL. W. H. HEUER, U. S. ARMY, RETIRED.

IMPROVEMENTS.

[The letters and figures in parentheses after the titles indicate the group, and the numerical order in the group, to which the respective improvements belong for purposes of appropriation.]

	Page.
1. Harbor at San Francisco, Cal. (A1)	3325
2. Redwood Creek, Cal. (A2)	3327
3. Oakland Harbor, Cal. (A3)	3328
4. Richmond Harbor, Cal. (A4)	3330
5. San Pablo Bay, Cal. (A5)	3331
6. Suisun Channel, Cal. (A6)	3332
7. Napa River, Cal. (A7)	3333
8. Petaluma Creek, Cal. (A8)	3334
9. Monterey Harbor, Cal. (A9)	3336
10. Humboldt Harbor and Bay, Cal. (A10)	3337

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1670 TO 1699.

SAN FRANCISCO, OAKLAND, RICHMOND, MONTEREY, AND HUMBOLDT HARBORS, REDWOOD AND PETALUMA CREEKS, NAPA RIVER, SAN PABLO BAY, MARE ISLAND STRAIT, AND SUISUN CHANNEL, CAL. (GROUP A.)

1. HARBOR AT SAN FRANCISCO, CAL. (A1).

OPERATIONS DURING THE FISCAL YEAR.

An inspection and patrol boat, the U. S. S. *Suisun*, was kept in commission throughout the year to prevent illegal dumping within the harbor and also to prevent unauthorized reclamation work or construction work in navigable waters. This patrol boat is used on all works in this vicinity, and the cost of its operation is apportioned among the appropriations for the several works according to the services rendered.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Class.	Total number of vessels.	Net registered tonnage.
Registered:		
Steamers [1]	4,567	6,112,064
Sailing [1]	852	1,027,064
Total	5,417	7,139,128

[1] Arrivals and departures.

The above figures were obtained from the vessel register at the Merchants' Exchange, but numerous river vessels and barges utilizing the waters of San Francisco Bay are not included therein.

Freight traffic.

Articles.	Short tons.	Value.
INBOUND TRAFFIC.		
Building and construction materials	78,112	$1,562,
Cigars, tobacco, and pipes	1,970	1,970,
Flour and mill stuffs	190,398	12,375,
Fruit and nuts	147,973	23,675,
Fuel	382,482	3,824,
General merchandise	1,306,217	195,932,5
Grain and hay	353,142	12,359,9
Groceries, canned goods, etc	324,507	64,901,4
Hides, wool, and cotton	48,051	9,610,2
Hops	988	494,0
Liquors	40,775	4,077,5
Live stock	52,720	7,908,0
Metals and ores	53,290	5,329,0
Miscellaneous	36,523	7,304,6
Oil, various grades	2,289,714	27,476,5
Provisions, dairy produce, etc	46,917	11,729,2
Salt	3,327	33,2
Sugar	677,735	84,716,8
Sulphur, nitrates, etc	40,525	6,078,7
Vegetables	142,082	11,366,5
Total	6,217,448	492,727.0
OUTBOUND TRAFFIC.		
Building and construction materials	34,155	483,1
Cigars, tobacco, and pipes	2,498	249,8
Copra	1,126	135,1
Explosives, arms, and ammunition	3,225	715,6
Flour and mill stuffs	11,405	627,3
Fruit and nuts	12,520	2,003,2
Fuel	12,335	123,3
Furniture	167	167,0
General merchandise	506,701	75,855,1
Grain and hay	50,991	1,774,7
Groceries, canned goods, etc	37,343	7,468,6
Hardware, machinery, etc	92,154	20,756,1
Hides, wool, and cotton	30,620	6,124,0
Hops	828	414.0
Liquors	8,639	863,9
Live stock	1,058	158,70
Metals and ores	2,706	270,60
Miscellaneous	52.523	10.504,60
Oil, various grades	2,179,688	26,156,25
Paint	3,182	1,431,90
Provisions, dairy produce, etc	1,633	408,25
Salt	18,719	187.19
Sugar	1,360	163,0
Sulphur, nitrates, etc	2,239	335,85
Vegetables	10,103	808,24
Total	3,076,918	158,185,73
Grand total	9,294,366	[1] 650,912,75

---

[1] Of this amount, 1,795,930 tons, at an estimated valuation of $269,394,000, was carried on the ferries plyin between San Francisco and transbay points, which ferries draw not to exceed 10 feet of water.

In addition to the above, 539,431 automobiles and 162,841 wagons and buggie were carried by ferries between San Francisco and transbay points.

APPROPRIATIONS.

Total appropriations prior to adoption of present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 549)		$154,927.84
Existing project:		
Mar. 3, 1899 (removal of Arch and Shag Rocks)	$100,000.00	
June 6, 1900 (removal of Arch and Shag Rocks)	170,000.00	
Mar. 3, 1903 (Blossom Rock)	50,000.00	
Mar. 4, 1911 (Rincon Reef)	30,000.00	

Existing project—Continued.		
Mar. 4, 1913, claim	$87,646.22	
June 23, 1913 (Centissima Rock)	110,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915), maintenance	12,000.00	
July 27, 1916	15,000.00	
		$574,646.22
Total		729,574.06
June 30, 1908, unexpended balance returned to surplus fund of Treasury		3,470.32
Net total		726,103.74

Receipts from sales, etc., $3.18.

2. REDWOOD CREEK, CAL. (A2).

OPERATIONS DURING THE FISCAL YEAR.

No work was done during the year.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers [1]	99	4,729
Sailing vessels [1]	8	428
Unrigged [1]	23	2,601
Gas boats [1]	2	46
Total	132	7,804

[1] Trips.

Freight traffic.

Article.	Short tons.	Value.
Coal	244	$2,928
Crude oil	12,384	86,688
Hay	842	12,630
Leather, hides, and glue stock	1,522	465,732
Lumber	1,624	19,488
Tallow	69	7,830
Tan bark	6,308	113,544
Miscellaneous	1,278	255,600
Total	24,271	964,440

APPROPRIATIONS.

Total of appropriations prior to adoption of present project (see H. Doc. No. 1491, 63d Cong., 3d. sess., p. 536)		$31,800.00
Present project:		
June 25, 1910	$12,000.00	
Mar. 4, 1913	3,000.00	
July 27, 1916	10,250.00	
		25,250.00
Total		57,050.00
June 30, 1908, unexpended balance returned to Treasury		357.34
Net total		56,692.66

3. OAKLAND HARBOR, CAL. (A3).

OPERATIONS DURING THE FISCAL YEAR.

At the beginning of the fiscal year work was in progress under contract to make a cut 200 feet wide at the bottom and 30 feet deep for a length of 9,200 feet between the jetties at the entrance to the harbor, making a completed channel 500 feet wide and 30 feet deep, as required by the approved project. A total of 718,777 cubic yards of material was removed during the year at a contract price of 7.4 cents per cubic yard, amounting to $53,189.50. All of the material was deposited south of the south jetty and work under the contract was completed March 13, 1918.

In February, 1918, a second contract was entered into to dredge a channel 150 feet wide and 18 feet deep in the Oakland Tidal Canal from Park Street Bridge easterly to San Leandro Bay, a distance of about 6,700 feet. During the year a total of 55,496 cubic yards was removed under this contract at a contract price of 29.4 cents per cubic yard, amounting to $16,315.82. On account of being unable to secure sufficient discharge pipe to reach available dumping ground, the contractors stopped dredging under this contract on May 13, 1918, and had not resumed operations at the end of the fiscal year.

In addition, the waterway was patrolled by the United States crusier *Suisun* to prevent illegal dumping or other infractions of the War Department regulations for the preservation of navigable waters.

CONTRACTS IN FORCE.

Name of contractor: San Francisco Bridge Co.
Amount and character of work: Dredging about 1,032,000 cubic yards of material from Oakland Harbor, Cal.
Price: 7.4 cents per cubic yard.
Date of approval: February 9, 1917.
Date of commencement: March 27, 1917.
Date of expiration: June, 1918.
Percentage of completion: 100 per cent.

Name of contractor: American Dredging Co.
Amount and character of work: Dredging about 381,000 cubic yards of material from Oakland Harbor, Cal.
Price: 29.4 cents per cubic yard.
Date of approval: February 23, 1918.
Date of commencement: April 18, 1918.

Date of expiration: January 1, 1919.
Percentage of completion: 13.7 per cent.

Name of lessor: American Dredging Co.
Amount and character of work: Lease of storeroom for use as boathouse.
Price: $10 per month.
Date of approval: Lease not requiring approval of Chief of Engineers.
Date of commencement: September 1, 1917.
Date of expiration: August 31, 1918.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation: Opened January 1; closed December 31.

Vessel classification.

Class.	American.	Foreign.	Total.	Net registered tonnage.
Registered:				
Steamers	[1] 2,933	23	2,956	1,615,946
Gas boats	1,284	....	1,284	56,786
Sailing vessels	282	....	282	153,000
Unrigged	2,522	....	2,522	750,310
Total	7,021	23	7,044	2,576,042

[1] Trips.

NOTE.—39,866,606 passengers carried on ferry lines with terminals at Oakland.

Freight traffic.

Article.	Short tons.	Value.
Building material	94,367	$188,734
Lumber	745,516	8,946,192
Shingles	1,941	29,115
Canned goods	204,092	20,409,200
Cement	18,820	188,200
Coal, coke, etc	507,997	6,095,964
Oil, all grades	283,079	2,137,982
Flour	6,038	452,850
Fruit	4,811	481,100
General merchandise	387,237	58,065,550
Grain	9,873	493,650
Groceries	8,272	2,481,600
Hay	3,653	73,060
Machinery, hardware, etc	56,378	16,913,400
Ore and metals	10,648	1,064,800
Salmon, canned	2,000	200,000
Salt	6,495	64,950
Vegetables	5,495	16,485
Miscellaneous	82,103	4,094,700
Total	2,438,815	122,417,532

In addition to the above, 356,940 automobiles and 157,996 wagons and buggies were carried by ferries between Oakland and San Francisco, and 29,689 tons of freight between Oakland and Point Richmond by car ferries of the Atchison, Topeka & Santa Fe Railway Co.

APPROPRIATIONS.

Total of appropriations prior to adoption of present project (see H. Doc. 1491, 63d Cong., 3d sess., p. 510)		$3, 433, 803
Present project:		
June 25, 1910	$250, 000	
Feb. 27, 1911	150, 000	
July 25, 1912	130, 000	
Mar. 4, 1913	275, 000	
Oct 2, 1914 (allotted Oct 7, 1914)	98, 000	
Mar. 4, 1915 (allotted Apr. 2, 1915)	80, 000	
July 27, 1916	106, 500	
Aug. 8, 1917	131, 000	
July 18, 1918	104, 000	
		1, 324, 500
Total		4, 758, 303

Receipts from sales, etc., $265.85.

4. RICHMOND HARBOR, CAL. (A4).

OPERATIONS DURING THE FISCAL YEAR.

Owing to delay on the part of local interests in complying with the conditions precedent to commencement of work by the United States, field work was not commenced, but a contract was entered into and dredging operations will commence in July, 1918.

CONTRACTS IN FORCE.

Name of contractor: American Dredging Co.

Amount and character of work: To dredge about 2,045,700 cubic yards of material from Richmond Harbor, Cal.

Price: 9.83 cents per cubic yard.

Date of appoval: June 17, 1918.

Date of commencement: July 26, 1918.

Date of expiration: August 21, 1919.

Percentage of completion: Work not commenced.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation: Opened January 1; closed December 31.

Vessel classification.

Class.	American.	Net registered tonnage.
Registered steamers	5,023	1,669,606

Freight traffic.

Articles.	Short tons.	Value.
Petroleum. all grades	2,268,772	$22,687,720
Lumber, etc	475,897	5,710,764
Coconut oil	6,140	1,964,800
Machinery, hardware, etc	750	225,000
Fish	600	120,000
Miscellaneous	7,379	368,950
Total	2,759,538	31,077,234

In addition to the above, 1,325,554 tons of miscellaneous freight was carried into San Francisco from Point Richmond, Cal., by the Atchison, Topeka & Sante Fe Railway Co., in car ferries.

APPROPRIATIONS.

UNITED STATES FUNDS.

Aug. 8, 1917	$100,000

CONTRIBUTED FUNDS.

Mar. 27, 1918, contributed by city of Richmond, Cal.	100,000
Total	200,000

5. SAN PABLO BAY, CAL. (A5.)

OPERATIONS DURING THE FISCAL YEAR.

Work was continued throughout the year redredging the channel across Pinole Shoal with the Government seagoing dredge *San Pablo.* The channel has been restored to a least depth of 30 feet at mean lower low water with the project width of 500 feet throughout the entire channel length. During the year 1,948,125 cubic yards of material was removed in the dredge's hoppers and deposited in shoal water about 1 mile distant from the channel. This dredge was drydocked toward the end of the fiscal year and given the usual annual cleaning and overhauling.

This waterway was also patrolled by the Government patrol boat *Suisun* to enforce the War Department's fishing regulations, etc. The total expenditures for the above work amounted to $83,180.45.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Foreign.	Total.	Net registered tonnage.	Passengers.
Registered:					
Steamers	[1] 7,489	22	7,511	5,287,801	....
Gas boats	1,523	....	1,523	46,576	....
Sailing vessels	29	3	32	40,799	....
Unrigged	1,394	....	1,394	824,403	....
Total	10,435	25	10,460	6,199,579	704,414

[1] Trips.

Freight traffic.

Articles.	Short tons.	Value.
Lumber	7,634,416	$91,612,992
Canned goods	1,133	113,300
Chemicals	739	55,425
Explosives, ammunition, etc	60,082	15,020,500
Flour	28,671	2,150,325
General merchandise	82,797	12,419,550
Grain	82,025	4,101,250
Groceries	1,063	318,900
Live stock	169	33,800
Molasses	86,865	2,605,950
Ore	11,046	1,104,600
Petroleum, all grades	3,248,993	32,489,930
Sugar	280,469	28,046,900
Fertilizer	744	83,480
Lead	9,512	142,680
Wines and liquors	534	53,400
Miscellaneous	2,260	113,000
Total	11,531,518	190,415,982

In addition to the above, 7,756 automobiles, wagons, and buggies were carried by vessels between San Francisco and points on San Pablo Bay.

APPROPRIATIONS.

Total of appropriations prior to adoption of present project (see H. Doc. 1491, 63d Cong., 3d sess., p. 550)		$353,168.41
Present project:		
Feb. 27, 1911	$400,000.00	
Aug. 24, 1912	122,000.00	
Mar. 4, 1913	40,000.00	
June 23, 1913	238,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	15,000.00	
Mar. 4, 1915 (deficiency act)	22,422.40	
July 27, 1916	105,500.00	
Aug. 8, 1917	68,000.00	
		1,010,922.40
Total		1,364,090.81

Receipts from sales, etc., $284.80.

6. SUISUN CHANNEL, CAL. (A6).

OPERATIONS DURING THE FISCAL YEAR.

None.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers	[1] 24	2,160
Unrigged	90	35,225
Total	114	37,385

[1] Trips.

Freight traffic.

Articles.	Short tons.	Value.
Fuel oil	59,667	$596,670
Miscellaneous	3,175	635,000
Total	62,842	1,231,670

APPROPRIATIONS.

June 25, 1910	$12,500
Mar. 4, 1913	14,500
Total	27,000

7. NAPA RIVER, CAL. (A7).

OPERATIONS DURING THE FISCAL YEAR.

An examination and survey was made in June, 1918, to determine the condition of the channel after the close of the rainy season, and it was found that full project dimensions existed up to the limit of the approved project. The reason for this is that private concerns have been dredging in the creek to obtain gravel for concrete construction work, and these operations maintain full project depths in the river.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered steamers [1]	305	78,058

[1] Trips.

Freight traffic.

Articles.	Short tons.	Value.
Building materials:		
Gravel, etc	66,181	$66,181
Lime, stone, etc	2,969	29,690
Lumber	3,018	36,184
Chemicals	169	12,675
Fruit and vegetables	743	37,150
Fuel oil	39,219	284,337
General merchandise	6,145	921,750
Grain, hay, and mill stuff	4,865	155,880
Hides and tanning	3,281	1,148,350
Mineral water	641	3,205
Wines and liquors	2,862	286,200
Total	130,093	2,981,602

APPROPRIATIONS.

Aug. 11, 1888	$7,500.00
Sept. 19, 1890	10,000.00
Aug. 18, 1894	4,000.00
June 3, 1896	4,000.00
June 13, 1902	3,000.00
Apr. 28, 1904 (allotted)	4,429.36
Mar. 3, 1905	1,000.00
Mar. 2, 1907 (allotted Mar. 24, 1907)	6,000.00
June 25, 1910 (allotted July 25, 1910)	5,000.00
Mar. 3, 1909 (allotted Apr. 12, 1909)	5,000.00
Feb. 27, 1911 (allotted Mar. 16, 1911)	4,000.00
July 25, 1912 (allotted Sept. 26, 1912)	3,000.00
Mar. 4, 1913 (allotted Apr. 11, 1913)	5,000.00
Mar. 4, 1915 (allotted Apr. 2, 1915)	1,000.00
July 27, 1916 (allotted Sept. 19, 1916)	9,000.00
Total	71,929.36

8. PETALUMA CREEK, CAL. (A8).

OPERATIONS DURING THE FISCAL YEAR.

Early in the fiscal year contract was entered into for dredging in the upper part of the creek with a clamshell dredge. This work was carried up to and across the mouth of McNears Canal, but it was impossible to proceed farther upstream because there was no practical means of disposing of dredging spoils. A total of 27,696 cubic yards of material was thus excavated and paid for, not including about 6,000 cubic yards additional that was dredged outside the prescribed channel prism. The total expenditures during the year amounted to $5,499.23.

The channel above McNears Canal up to the head of navigation has been badly in need of redredging for more than a year, but it is impossible to do this work with a clamshell dredge, and owing to the demand for hydraulic dredges on more urgent work, both public and private, in this district it is impracticable to secure reasonable bids for doing this work.

CONTRACT IN FORCE.

Name of contractor: Marshall C. Harris.

Amount and character of work: Dredging 27,696 cubic yards of material from Petaluma Creek, Cal.

Price: 17.5 cents per cubic yard.

Date of approval: Emergency contract; not approved by the Chief of Engineers.

Date of commencement: July 12, 1917.

Date of expiration: August 20, 1917.

Percentage of completion: 100 per cent.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers[1]	545	170,207	....
Gas boats[1]	199	9,228	....
Sailing vessels[1]	127	5,958	....
Unrigged[1]	503	76,971	....
Total	1,374	262,364	1,761

[1] Trips.

Freight traffic.

Articles.	Short tons.	Value.
Building material	95,478	$190,956
Lumber	18,710	224,520
Shingles	2,934	44,010
Automobiles	161	156,400
Canned goods	25,000	250,000
Cement	342	4,104
Coal, etc	259	3,108
Crude oil	31,157	218,099
Dairy products	1,301	650,500
Eggs	10,684	3,205,200
Flour, etc	30,920	2,319,000
Fruit	2,515	251,500
Furniture	102	20,400
Gasoline distillate, etc	460	23,000
General merchandise	13,691	2,053,650
Grain and mill stuff	58,135	2,616,075
Groceries	12,081	3,024,300
Hay and feed	6,764	135,280
Leather, hides, etc	862	431,000
Live stock	3,559	711,800
Machinery, iron, etc	3,174	952,200
Poultry	1,782	712,800
Salt	536	5,360
Shells	4,040	20,200
Vegetables	1,911	57,330
Wagons, buggies, etc	591	59,100
Wines, liquors, etc	1,871	187,100
Miscellaneous	353	17,650
Raw silk	50	650,000
Total	284,423	19,194,642

APPROPRIATIONS.

UNITED STATES FUNDS.

Total of appropriations prior to adoption of existing project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 525)		$70,000.00
Present project:		
Mar. 2, 1907 (allotted Apr. 24, 1907)	$15,239.00	
Mar. 3, 1909 (allotted Apr. 12, 1909)	10,000.00	
Mar. 12, 1909 (allotted by transfer of funds)	2,000.00	
June 25, 1910 (allotted July 25, 1910)	5,000.00	
Feb. 27, 1911 (allotted Mar. 16, 1911)	7,000.00	
Mar. 3, 1909 (allotted Feb. 17, 1912)	[1] 15,354.40	

---

[1] Allotment of $16,659, of which $1 304.60 was returned to the Treasury.

Present project—Continued.

July 25, 1912 (allotted Sept. 26, 1912)	$6,000.00	
Mar. 4, 1913 (allotted Apr. 11, 1913)	13,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	14,000.00	
July 27, 1916 (allotted Sept. 19, 1916)	21,500.00	
July 18, 1918	20,000.00	
		$129,093.40
Total		199,093.40

CONTRIBUTED FUNDS.

July 10, 1914, contributed by local interests	2,500.00
Grand total	201,593.40

9. MONTEREY HARBOR, CAL. (A9).

OPERATIONS DURING THE FISCAL YEAR.

None.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers	[1] 263	103,601
Sailing vessels	2	3,496
Gasoline fishing boats	89,650	355,370
Total	89,915	462,467

[1] Trips.

Freight traffic.

Articles.	Short tons.	Value.
Fish	24,088	$4,654,129
Fuel oil	217,503	1,522,521
General merchandise	6,061	2,509,340
Lumber	160	3,200
Miscellaneous	586	21,720
Total	248,398	8,710,910

APPROPRIATIONS.

July 25, 1912	$200,000
Deduction on account of transfer to other works, under authority of the river and harbor act approved Mar. 4, 1915	200,000

10. HUMBOLDT HARBOR AND BAY, CAL. (A10).

OPERATIONS DURING THE FISCAL YEAR.

At the beginning of the year work was in progress on the north jetty receiving stone under contract and placing it in the jetty by hired labor with Government plant. This work was continued until July 20, 1917, and then operations were suspended on account of the exhaustion of funds. During this period a total of 6,497.18 tons of stone were delivered and placed in the jetty, extending the enrockment 10 linear feet making a total jetty length of about 7,000 feet and leaving 500 feet of the project length unfinished.

When further funds later became available through a new appropriation it was found, through advertising for bids, that it was impossible to make a new contract at a reasonable price, owing to the scarcity of labor and the high cost of materials of all kinds. Consequently, work was not resumed on the jetties. The Government plant was overhauled, put in good repair, and stored away for safekeeping while the work is shut down. A force of three reliable employees was retained to take care of the Government plant, maintaining a night and day watch.

When the stormy weather in the winter commenced, it was found that serious scouring developed in the vicinity of the north jetty ferry landing slip, endangering the safety of this structure to such an extent that it was necessary to place considerable rock revetment to stop the scour. A total of 618 tons of small rock was picked up by hand from the shore end of the jetty and placed in the revetment. The total expenditures for the year were $82,816.38, of which $57,513.24 was expended in paying outstanding liabilities incurred during the previous year.

CONTRACTS IN FORCE.

Name of contractor: Pacific Engineering & Construction Co.

Amount and character of work: To furnish 210.000 tons, more or less, of different classes of stone for use in rebuilding the jetties at Humboldt Harbor, Cal.

Prices: $1.77⅜, $1.59⅜, and $1.53⅜ per ton, according to class, for stone delivered at the south jetty, and $1.70⅜, $1.52⅜, and $1.46⅜ per ton, according to class, for stone delivered at the north jetty.

Date of approval: Emergency contract, not requiring approval by the Chief of Engineers.

Date of commencement: August 17, 1916.

Date of expiration: August 16, 1917.

Percentage of completion: 100.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers[1]	558	271,298	....
Sailing vessels[1]	36	26,743	....
Gas boats[1]	186	3,662	....
Unrigged[1]	16	21,604	....
Total	796	323,307	12,153

[1] Trips.

Freight traffic.

Articles.	Short tons.	Value.
Building materials	521	$5,210
Lumber	288,434	2,884,340
Shakes	49,014	588,168
Shingles	5,566	83,490
Automobiles	633	443,100
Canned goods	870	87,000
Cement	1,543	18,516
Coal	2,404	28,848
Crude oil	27,698	193,886
Dairy products	4,172	1,668,800
Eggs	5	1,250
Fish	291	29,100
Flour, etc	6,094	457,050
Fruit	1,381	138,100
Furniture	648	129,600
Gasoline and distillate	3,639	145,560
General merchandise	34,858	5,228,700
Groceries	3,829	1,914,500
Hay, etc	4,662	93,240
Leather, hides, etc	416	208,000
Live stock	70	14,000
Machinery, hardware, iron, etc	7,442	2,232,600
Paints and oils	79	9,900
Salt	820	8,200
Vegetables	774	38,700
Wines and liquors	2,548	216,580
Miscellaneous	15,490	1,549,000
Total	463,901	18,415,438

APPROPRIATIONS.

UNITED STATES FUNDS.

Total of appropriations prior to adoption of present project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 466)		$2,187,615.00
Present project:		
Mar. 2. 1907 (for channel in front of Eureka)	$83,000.00	
June 25, 1910	150,000.00	
Feb. 27, 1911	170,000.00	
Feb. 27, 1911 (for channel in front of Eureka)	15,000.00	
Aug. 24, 1912	250,000.00	
Mar. 4, 1913 (for channel in front of Eureka)	20,000.00	
June 23, 1913	467,400.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	200,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915, and Mar. 21, 1916)	350,000.00	
July 27, 1916	450,000.00	
Aug. 8, 1917	371,000.00	
		2,526.400.00
		4,714,015.00

CONTRIBUTED FUNDS.

Dec. 21, 1914 (for channel in front of Eureka)	9,000.00
Grand total	4,723,015.00

Receipts from sales, etc., $1,375.12.

IMPROVEMENT OF RIVERS AND HARBORS IN THE THIRD SAN FRANCISCO, CAL., DISTRICT.

REPORT OF COL. L. H. RAND, CORPS OF ENGINEERS.

IMPROVEMENTS.

[The letters and figures in parentheses indicate the group, and the numerical order in the group, to which the respective improvements belong for purposes of appropriation.]

	Page.
1. San Joaquin River, Cal. (A1)..	3339
2. Stockton and Mormon Channels (diverting canal), Cal. (A2)..	3342
3. Mokelumne River, Cal. (A3)...	3343
4. Sacramento River, Cal. (A4)..	3344
5. Feather River, Cal. (A5).......	3348

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1699 TO 1719.

SACRAMENTO, FEATHER, SAN JOAQUIN, AND MOKELUMNE RIVERS, AND STOCKTON AND MORMON CHANNELS (DIVERTING CANAL), CAL. (GROUP A).

1. SAN JOAQUIN RIVER, CAL. (A1).

OPERATIONS DURING THE FISCAL YEAR.

Dredging.—New work includes an excavation of 22,650 cubic yards under contract with the American Dredging Co. by the dredge *Uncle Sam* at a price of $0.075 per cubic yard, cost and expenditure being $1,698.75. The additional overhead cost and expenditure was $850.10, making a total cost and expenditure of $2,548.85, or $0.113 per cubic yard. A channel 2,000 feet long, 200 feet wide, and 9 feet deep was dredged in the river near Elmwood Pump, 4 miles below the mouth of Stockton Channel, and a channel 1,300 feet long, 180 feet wide, and 9 feet deep was dredged in the river at the Country Club, 1½ miles below the mouth of Stockton Channel. Other new work was done under contract with the Olympian Dredging Co. on an hourly basis of payment by the dredge *Thor.* A total of 20,600 cubic yards was excavated at a cost and expenditure of $911.91, or $0.044 per cubic yard. The additional overhead cost and expenditure was $465.89, making a total cost and expenditure of $1,377.80, or $0.067 per cubic yard. The channel in Stockton Channel was dredged to the project width of 200 feet and depth of 9 feet at two points to serve as a test of the proper slopes to be used and method of handling the dredged material. The total length of channel dredged was 150 feet. There was also expended $893.33 for liabilities of the fiscal year 1917 for new work.

Maintenance includes an excavation of 3,600 cubic yards under contract with the American Dredging Co. by the dredge *Uncle Sam* at a price of $0.075 per cubic yard, cost and expenditure being $270. The additional overhead cost and expenditure was $135.50, making a total cost and expenditure of $405.50, or $0.113 per cubic yard. A channel 1,600 feet long, 100 feet wide, and 9 feet deep was dredged in the river near Elmwood Pump, 4 miles below the mouth of Stockton Channel. Other maintenance work was done under contract with the Olympian Dredging Co. on an hourly basis of payment by the dredge *Thor*. A total of 43,700 cubic yards were excavated at a cost and expenditure of $2,166.06, or $0.050 per cubic yard. The additional overhead cost and expenditure was $1,398.74, making a total cost and expenditure of $3,564.80, or $0.082 per cubic yard. A total length of 6,300 feet of channel was dredged to project dimensions, a width of 80 feet and depth of 4 feet, in Mormon Channel. There was expended $3,382.86 for liabilities of the fiscal year 1917 for maintenance.

Surveys.—Surveys were made of various shoals and portions of the channel to ascertain if the project widths and depths were available and to determine if dredging was necessary. Soundings were made after dredging to measure the excavation. In all 12 river miles were covered on the San Joaquin River, Stockton Channel, Mormon Channel, Fremont Channel, and McLeod Lake, at a total cost of $1,867.89 and expenditure of $1,793.08, cost being $155.66 per river mile, all for maintenance. Outstanding liabilities at the end of the year, included in the total cost, are $74.81.

Rights of way and miscellaneous administration.—The United States during the fiscal year of 1917 had furnished private interests information and descriptions of 29.17 acres of right of way required near the mouth of Stockton Channel for widening and straightening the channel, and had received deeds to 17.10 acres thereof. During the fiscal year of 1918 information and descriptions were furnished private interests for the procural of six parcels near Black Slough Landing, 9 miles below Stockton, a total of 106.66 acres. Formulation of descriptions for rights of way at Smiths Canal and Browns Island is being delayed pending final decision as to location of channel. Miscellaneous administration includes all work in connection with the granting of permits, harbor line and bridge investigations, and miscellaneous operations for the protection of navigation. The total cost and expenditure for all of the above was $1,977.17. The sum of $8,626.78, expended for work done under "Control of floods, removal of débris, and improvement of Sacramento River, Cal.," in the district of the California Débris Commission, and repaid during the fiscal year, is not included in the total of expenditures.

CONTRACTS IN FORCE.

DREDGING.

Name of contractor: American Dredging Co.
Amount: 35,700 cubic yards.
Price per unit: 7½ cents per cubic yard.
Date of approval: May 3, 1917.
Date of commencement: June 28, 1917.
Date of completion: July 26, 1917.
Percentage of completion at end of fiscal year: 100.

COMMERCIAL STATISTICS.

Navigation was possible during the entire year.

Vessel classification.

Classes.	Number.	Net tonnage reported.	Passengers.
Registered:			
Steamers	21	6,852	64,400
Gas	53	1,728	130,191
Sailing	12	680	
Unregistered:			
Steamers			
Gas	10		11,540
Sailing	1		
Unrigged (tonnage reported)	22	3,818	
Unrigged (tonnage not reported)	19		
Total	138	13,078	206,131

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Tonnage for which rates and distances are known.	Average haul.	Rate per ton-mile.
					Miles.	
Asparagus	71,000 boxes	1,704	$102,240	1,180	24	$0.078
Automobiles	1,331	1,331	1,796,850	1,331	89	.056
Bags	3,626 tons	3,626	1,631,700	908	52	.042
Barley	44,771 tons	44,771	2,238,550	38,399	72	.017
Beans	27,425 tons	27,425	4,936,500	26,724	70	.020
Buggies	484	145	48,500	145	88	.075
Butter	207 tons	207	124,200	203	58	.065
Canned goods	1,488 tons	1,488	252,960	1,488	46	.043
Celery	187,819 crates	10,330	516,500	330	58	.027
Cement	756 barrels	142	2,130	142	73	.021
Coal	374 tons	374	3,740	271	46	.043
Coal oil	4,548 drums	2,092	83,680	71	69	.053
Cordwood	3,535 cords	7,070	24,745	6,920	53	.035
Corn	7,430 tons	7,430	430,940	7,430	56	.019
Distillate	42,228 barrels	9,839	305,009	242	75	.050
Fish	668 tons	668	93,520	45	56	.106
Flour	498,756 barrels	48,878	3,910,240	47,564	83	.011
Fruit, fresh	241 tons	241	14,460	235	58	.057
Fuel oil	225,776 barrels	37,253	335,277	14,282	40	.024
Gasoline	22,379 barrels	4,901	245,050	53	75	.050
General merchandise	120,281 tons	120,281	21,049,175	119,981	86	.018
Gravel	2,026 cubic yards	3,039	2,431	1,039	50	.011
Hay	9,476 tons	9,476	189,520	6,671	64	.035
Horses	2,059 head	1,235	370,500	1,235	55	.069
Lubricating oils	949 barrels	219	21,900	25	40	.094
Lumber	16,786,000 feet b. m.	25,178	503,560	15,670	133	.015
Machinery and tools	2,356 tons	2,356	942,400	2,131	58	.094
Meat	206 tons	206	61,800	10	6	.667
Millstuffs	33,267 tons	33,267	1,663,350	25,467	87	.011
Milk, cream	534 tons	534	53,400	534	29	.123
Miscellaneous	2,407 tons	2,407	264,770	1,399	38	.102
Oats	1,470 tons	1,470	73,500	1,170	80	.013
Onions	59,071 tons	59,071	2,362,840	56,208	59	.023
Potatoes	1,606,187 sacks	94,765	4,264,425	83,487	62	.018
Rice	206 tons	206	18,540	206	20	.100
Rock, crushed	9,682 cubic yards	14,523	17,428	14,373	44	.016
Sand	23,972 cubic yards	35,957	24,181	8,395	44	.013
Seed	2,464 tons	2,464	320,320	2,464	20	.100
Sheep	100,306 head	3,611	812,475	3,461	30	.031
Shooks	100,000	100	1,750			
Straw	177 tons	177	1,770			
Vegetables, miscellaneous	786 tons	786	47,160	786	58	.049
Wagons	128	128	22,400	128	64	.081
Water	299,826,000 gallons	1,249,275	44,974			
Wheat	20,210 tons	20,210	141,400	20,210	94	.014
Total		1,896,856	50,367,760	513,013		

The large increase of tonnage over that of 1916 was due to the item " v which has been pumped from the river for many years and transport industrial use, but was not noted in previous reports. The shortage in t maining tonnage was due chiefly to a decrease of brick and lumber shi on account of curtailment in building operations; and the storage of hay stuffs, and potatoes for future Government requirements, with a probab crease in shipments of the latter during 1918. The value, exclusive of th " water," increased about 20 per cent over that of 1916.

APPROPRIATIONS.

Date of rivers and harbors act.	Maintenance.	9-foot channel and cut-offs.	Fremont Channel and McLeod Lake, arms of Stockton Harbor.		To
			Improvement.	Maintenance.	
Aug. 14, 1876	$20,000.00				$20,
June 14, 1880	20,000.00				20,0
Mar. 3, 1881	40,000.00				40,0
Aug. 2, 1882	40,000.00				40,0
July 5, 1884	20,000.00				20,0
Aug. 5, 1886	18,750.00				18,7
Aug. 11, 1888	25,000.00				25,0
Sept. 19, 1890	75,000.00				75,0
July 13, 1892	65,000.00				65,0
Aug. 18, 1894	50,000.00				50,0
June 3, 1896	57,750.00				57,75
Mar. 3, 1899	20,000.00				20,00
June 13, 1902	18,000.00				18,00
Apr. 28, 1904	[1] 35,170.00				35,17
Mar. 3, 1905	20,000.00				20,00
Mar. 2, 1907	30,000.00				30,00
Mar. 3, 1909	[2] 20,000.00				20,00
June 25, 1910	35,000.00	$40,000.00			75,00
Feb. 27, 1911	25,000.00				25,000
July 25, 1912	40,000.00		$11,000.00		51,000
Mar. 4, 1913		159,632.00			159,632
Do	[3] 25,000.00			[3] $500.00	[3] 25,500
July 27, 1916	[4] 11,000.00				11,000.
Total	710,670.00	199,632.00	11,000.00	500.00	921,802.
Transferred under act of Mar. 4, 1915		30,000.00			30,000.
Net total	710,670.00	169,632.00	11,000.00	500.00	891,802.

---

[1] Allotted May 31, 1904.

[2] Allotted Apr. 10, 1909.

[3] Apportioned by War Department from $26,500 appropriation, which provides for three separate projec in lump sum.

[4] Includes Fremont Channel and McLeod Lake.

2. STOCKTON AND MORMON CHANNELS (DIVERTING CANAL), CAL. (A2).

OPERATIONS DURING THE FISCAL YEAR.

Removal of obstructions.—During November, December, and January a crew of 15 men removed brush, overhanging trees, stumps, logs, and snags from the channel and banks. The total cost and expenditure was $2,881.67 for clearing 10.5 miles along the canal and Calaveras River sections, or $274.44 per mile.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

See San Joaquin River, Cal.

APPROPRIATIONS.

Date of river and harbor acts.	Improvement.	Maintenance.	Total.
June 13, 1902	$50,000.00		$50,000.00
Mar. 3, 1903	50,000.00		50,000.00
Apr. 28, 1904	75,000.00		75,000.00
Mar. 3, 1905	49,316.00		49,316.00
Mar. 4, 1909	56,079.00		56,079.00
Mar. 4, 1913		[1] $1,000.00	1,000.00
July 27, 1916		10,000.00	10,000.00
Total	280,395.00	11,000.00	291,395.00

[1] Allotted from $26,500 appropriation of Mar. 4, 1913, which provided for three projects in lump sum.

3. MOKELUMNE RIVER, CAL. (A3).

OPERATIONS DURING THE FISCAL YEAR.

Dredging.—In October the clamshell dredge *Thor* worked for 82½ hours under an hourly basis contract, being paid $8.20 an hour for actual dredging and time held idle for the United States during periods of less than four hours, and $6.15 an hour for towing time and time held idle for the United States during periods of more than four hours. Shoals from New Hope Landing to a point one-half mile downstream on the North Fork, formed during the previous high-water season, were dredged from a depth of 4 feet at mean lower low water to the project depth of 6 feet and a minimum width of 50 feet. The contractor was paid $653.78, and the cost of towing, inspection, soundings, and supervision was $346.22, making a total cost and expenditure of $1,000, for 18,800 cubic yards excavated, or $0.053 per cubic yard. This was all for maintenance.

CONTRACTS IN FORCE.

See "Contracts in force," under "Control of floods, removal of débris, and improvement of Sacramento River, Cal."

COMMERCIAL STATISTICS.

Navigation was possible during the entire year.

Vessel classification.

Classes.	Number.	Net tonnage reported.	Passengers.
Registered:			
Steamers	6	2,309	3,493
Gas	10	428	15,416
Sailing			
Unregistered:			
Gas	8		52
Sailing	1		
Unrigged (tonnage reported)	8	840	
Unrigged (tonnage not reported)	13		
Total	46	3,577	18,961

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Tonnage for which rates and distances are known.	Average haul.
Asparagus	26,875 boxes	645	$38,760	128	68
Bags	151 tons	151	67,950	151	48
Barley	12,240 tons	12,240	612,000	12,240	52
Beans	6,483 tons	6,483	1,166,940	6,482	68
Canned goods	1,221 tons	1,221	207,570	1,221	63
Celery	5,019 crates	276	13,800	276	72
Cordwood	187 cords	374	1,309	374	50
Corn	7,612 tons	7,612	441,496	7,612	66
Fruit, fresh	181 tons	181	10,860	181	32
Fuel oil	10,970 barrels	1,810	16,290	1,810	75
General merchandise	12,930 tons	12,930	2,262,750	12,930	93
Hay	600 tons	600	12,000	600	47
Horses	504 head	302	90,600	302	76
Lumber	661 M feet b. m.	991	19,820	977	70
Machinery and tools	314 tons	314	125,600	314	44
Millstuffs	136 tons	136	6,800	3	30
Miscellaneous	597 tons	597	65,670	558	45
Oats	724 tons	724	36,200	724	68
Onions	9,093 tons	9,093	363,720	9,090	67
Potatoes	281,712 sacks	16,621	747,945	16,573	69
Rock, crushed	1,600 cubic yards	2,400	2,880	2,400	75
Sheep	49,389 head	1,778	400,060	1,778	39
Vegetables, miscellaneous	779 tons	779	46,740	779	71
Wheat	696 tons	696	48,720	696	74
Total		78,954	6,806,410	78,199	

APPROPRIATIONS.

July 5, 1884	$8,500	Feb. 27, 1911	$5,
Aug. 5, 1886	2,500	Mar. 4, 1913	1,
Aug. 11, 1888	2,000	July 27, 1916	
July 13, 1892	2,500	Aug. 8, 1917	1,
Aug. 18, 1894	2,500	July 18, 1918 (allotted July 23, 1918)	1,
Mar. 3, 1905	2,500		
Mar. 2, 1907	2,500		
June 25, 1910	2,000	Total	34,0

4. SACRAMENTO RIVER, CAL. (A4).

OPERATIONS DURING THE FISCAL YEAR.

Removal of obstructions.—The river was cleared of snags, logs stumps, and overhanging trees from its mouth to Chico Landing (202 miles). Also some similar work was done between Chico Landing and Tehama, a distance of 37 miles. These operations were carried on mostly by the snagboat *Seizer* with a crew varying from 28 to 40 men, but the work between Chico Landing and Tehama was done by a shore party of about 10 men. Following is a table of obstructions removed in the different portions of the river:

Sections of the river.	Distance.	Old piles removed from channel.	Logs, trees, stumps, and snags blasted or removed from channel.	Overhanging trees and stumps cut from banks.	Trees and logs on sand bars and banks destroyed.	Days operated upon by snag boat.
	Miles.					
Mouth of river to Sacramento	60.7	29				7
Sacramento to Colusa	90.0		847	262	369	90
Colusa to Chico Landing	51.3		2,147	4,078	1,691	116
Chico Landing to Tehama	37.0		497	625	448	
Total	239.0	29	3,491	4,965	2,508	213

The total cost was $54,215.16 for removing 10,993 obstructions, or $4.93 per obstruction. Total expenditures were $48,829.67 after adding liabilities of $827.71 as of July 1, 1917, and subtracting liabilities of $3,713.20 as of July 1, 1918, and depreciation of the snag boat *Seizer* of $2,500. There was no other appreciable change in value of assets between the beginning and end of the year.

Wing dams.—Four new wing dams were built, at a total cost of $7,567.84 for 728 linear feet, or $10.40 per linear foot. With a depreciation charge of $50 and no other appreciable change in value of assets and no liabilities at the beginning and end of the year, expenditures were $7,517.84. Two were built near Kiesels, 11 miles above Sacramento, 200 feet and 208 feet long, respectively; one at Sixmile Bar, 6 miles above Sacramento, 200 feet long; and one at the Southern Pacific Railroad bridge, Sacramento, 120 feet long. Thirty dams between the mouth of the Feather River and Freeport were repaired at a total cost of $8,533.94, or $284.46 per dam. With a depreciation charge of $50 and no other appreciable change in value of assets, and no liabilities at the beginning and end of the year, the expenditures were $8,483.94. All wing-dam work was done with hired labor and Government plant. The necessary brush filling was procured by clearing the high-water channel.

Dredging.—Channels were dredged through shoals at five places on the river, as follows: At Sacramento Bend, one-half mile below Sacramento, 400 feet long, 120 feet wide, and 9 feet deep; between the Southern Pacific Railroad bridge at Sacramento and the mouth of the American River, 3,000 feet long, 120 feet wide, and 8 feet deep in September, 1917, and 1,400 feet of this channel redredged in June, 1918; at Merkleys, 8.6 miles above Sacramento, 100 feet long, 90 feet wide, and 7 feet deep; at Kiesels, 10.6 miles above Sacramento, 200 feet long, 90 feet wide, and 7 feet deep; and at Vernon, 20 miles above Sacramento, 1,800 feet long, 120 feet wide, and 7 feet deep. The above work was done by the clamshell dredges *Ajax*, *Thor*, and *Trojan*, under contract with the Olympian Dredging Co. on an hourly basis of payment. For details of contracts, see "Contracts in force," under "Control of floods, removal of débris, and improvement of Sacramento River, Cal." A total of 82,553 cubic yards were excavated, at a cost of $6,770.82, or $0.082 per cubic yard, of which $5,861.46 was due to the contractor and $909.36 was the additional overhead cost to the Government. Total expenditures were $3,804.62, after subtracting liabilities of $2,714.70 owed the contractor and $251.50 owed for additional overhead expense at the end of the year

COMMERCIAL STATISTICS.

Navigation was possible during the entire year.

Vessel classification.

Classes.	Number.	Net tonnage reported.
Registered:		
Steamers	39	14,059
Gas	93	2,800
Sailing	12	619
Unregistered:		
Gas	28	....
Sailing	....	....
Unrigged (tonnage reported)	43	12,502
Unrigged (tonnage not reported)	13	....
Total	228	29,980

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Tonnage for which rates and distances are known.	Average haul.
					Miles.
Asparagus	619,167 boxes	14,860	$891,600	12,750	45
Asphalt	1,610 tons	1,610	24,150	1,592	78
Automobiles	5,891	5,891	7,952,850	5,891	107
Bags	828 tons	828	372,600	811	98
Barley	122,449 tons	122,449	6,122,450	118,425	117
Beans	60,363 tons	60,363	10,865,340	59,348	102
Brick	10,336,000	25,840	129,200	25,840	62
Butter	114 tons	114	68,400	114	93
Canned goods	34,512 tons	34,512	5,867,040	34,512	84
Cattle	340 head	170	27,200	170	63
Celery	92,764 crates	5,102	255,100	5,102	27
Cement	12,602 barrels	2,369	35,535	2,369	89
Cheese	1,378 tons	1,378	523,640	274	91
Coal	6,113 tons	6,113	61,130	3,574	98
Coal oil	4,309 drums	1,982	79,280	25	10
Containers, empty	1,439 tons	1,439	151,095	1,242	78
Cordwood	2,195 cords	4,390	15,365	4,390	39
Corn	4,628 tons	4,628	268,424	4,628	151
Distillate	205,485 barrels	47,878	1,484,218	36,862	100
Fish	748 tons	748	104,720	276	80
Flour	73,388 barrels	7,192	575,360	7,185	100
Fruit, dried	6,200 tons	6,200	1,085,000	6,200	116
Fruit, fresh	29,758 tons	29,758	1,785,480	17,778	60
Fuel oil	410,158 barrels	67,676	609,084	48,486	100
Gasoline	82,763 barrels	18,125	906,250	7,923	48
General merchandise	189,998 tons	189,998	33,249,650	189,687	90
Hay	22,782 tons	22,782	455,640	7,282	81
Hides	17,240 hides	431	215,500	431	112
Hogs	12,220 head	1,222	305,500	1,222	147
Honey	217 tons	217	43,400	217	140
Horses	1,912 head	1,147	344,100	992	92
Iron and steel	1,115 tons	1,115	111,500	1,115	74
Lubricating oils	1,355 barrels	313	31,300	....	....
Lumber	23,944,000 feet b. m	35,916	718,320	33,237	88
Machinery and tools	27,717 tons	27,717	11,086,800	27,454	92
Meat	100 tons	100	30,000	100	80
Mill stuffs	556 tons	556	27,800	556	85
Milk, cream	107 tons	107	10,700	107	90
Miscellaneous	5,788 tons	5,788	636,680	3,789	82
Oats	1,426 tons	1,426	71,300	1,086	82
Onions	12,712 tons	12,712	508,480	12,669	75
Piles	488,134 linear feet	7,322	146,440	469	67
Potatoes	260,407 sacks	15,364	691,380	13,742	88
Rice	62,398 tons	62,398	3,743,880	62,368	164
Rock, crushed	2,000 cubic yards	3,000	3,600	10	20
Sand	25,094 cubic yards	37,641	25,219	30	20
Seed	3,720 tons	3,720	483,600	3,720	105

Freight traffic—Continued.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Tonnage for which rates and distances are known.	Average haul.	Rate per ton-mile.
					Miles.	
Sheep	72,028 head	2,593	583,425	2,588	50	.051
Shingles	25,294,000	1,897	49,322	1,147	90	.041
Shooks	6,260,000	6,260	109,550	6,260	43	.035
Straw	619 tons	619	6,190	87	100	.025
Sugar	3,435 tons	3,435	429,375	3,435	86	.022
Vegetables, miscellaneous	3,296 tons	3,296	197,760	3,296	88	.032
Wagons	682	682	119,350	682	83	.061
Wheat	25,996 tons	25,996	1,819,720	25,850	80	.019
Wool	1,525 bales	305	305,000	305	128	.083
Total		947,690	96,820,992	809,700		

In general, the distances carried and rates for freight are known for short hauls of small lots only, and the rates per ton-mile are therefore large.

Above Sacramento 323,002 tons of freight were carried, valued at $34,928,029, and below Sacramento 779,671 tons were carried, valued at $75,979,185, a large percentage of the total freight appearing in each section. Upstream to Sacramento were carried 289,210 tons, valued at $31,710,958; downstream from Sacramento, 91,174 tons, valued at $10,366,278; upstream from Sacramento, 82,688 tons, valued at $13,708,933; downstream to Sacramento, 85,331 tons, valued at $7,132,874; and freight not shipped from nor delivered to Sacramento was 399,287 tons, valued at $33,901,949. Of the total freight carried downstream to Sacramento, 62 per cent was grain reshipped from Sacramento by the Western Pacific Railroad, thus relieving freight congestion on other railroads and assisting delivery of foodstuffs and feed from farms near the river to eastern points for war purposes. A large percentage of foodstuffs and feed delivered to points on San Francisco Bay was later reshipped to eastern points by rail, materially relieving rail congestion in producing districts.

Through the Southern Pacific Railway drawbridge at H Street, Sacramento, 1,102 steamboats, 944 barges, 441 gas boats, 18 dredges, and 13 pile drivers passed during the calendar year 1916. Through the Southern Pacific Railway drawbridge at Knights Landing 570 steamboats, 476 barges, 285 gas boats, 11 dredges, 9 pile drivers, and 5 house barges passed. Through the Colusa County highway drawbridge at Colusa 447 steamboats, 261 barges, 29 gas boats, and 2 dredges passed. In the above tabulation only those passages requiring draw operation are enumerated, and in general the figures are lower than those of the preceding year because the shorter high-water season and the lower level of the low-water stages were both factors which tended to minimize the number of draw operations required.

Surveys.—Surveys were made during July, August, and September while the river was approaching the low-water stage, to ascertain accurately the location and extent of shoals and to determine in ample time what wing dams or dredging would be necessary to maintain the project depths. In some cases surveys were made to determine the effect of the wing dams put in during the previous year. In this way portions of the river between Vernon and Freeport were covered in detail, the total cost and expenditure being $2,944.28 for the complete distance of 33.7 river miles, or $87.37 per river mile.

CONTRACTS IN FORCE.

See "Contracts in force," "Control of floods, removal of débris, and improvement of Sacramento River, Cal."

APPROPRIATIONS.

Previous projects (acts of Mar. 3, 1875, to Aug. 18, 1904, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 540)		$760,000
Present projects:		
Mar 3, 1899	$30,000	
June 6, 1900	60,000	
June 13, 1902	25,000	
Apr. 28, 1904 (allotted May 23 and 31, 1904)	22,000	
Mar. 2, 1907	50,000	
Mar. 3, 1909 (allotted Apr. 9, 1909)	25,000	
June 25, 1910	30,000	
Feb. 27, 1911	25,000	
July 25, 1912	65,000	
Mar. 4, 1913	40,000	
Mar. 4, 1915 (allotted Apr. 2, 1915)	60,000	
July 27, 1916	105,000	
Aug. 8, 1917	30,000	
July 18, 1918 (allotted July 23, 1918)	9,000	
Mar. 4, 1915 (allotted Oct. 16, 1918)	30,000	
		606,000
Total		1,366,000

Receipts from sales, etc., $2,607.08.

5. FEATHER RIVER, CAL. (A5).

OPERATIONS DURING THE FISCAL YEAR.

Removal of obstructions.—Work of clearing the river of obstructions from its mouth to Marysville, a distance of 28.3 miles, was in progress from July to February by a shore party of about 9 men. In all, 193 snags and logs were removed or blasted from the channel, 2,455 overhanging trees and stumps cut from the banks, and 680 trees and logs destroyed on sand bars and banks. The total cost and expenditure was $3,721.88 for 5,138 obstructions removed, or at the rate of $0.72 per obstruction.

Wing dams.—One wing dam (Feather River No. 1) 144 feet long was built, 250 feet above the mouth of the river, at a total cost and expenditure of $979.98 or $6.81 per linear foot. One wing dam (Feather River No. 2) a half mile above the mouth, was repaired at a total cost and expenditure of $28.14. This work was done by the United States pile driver *Tackle*, assisted by the United States snag boat *Seizer*, with a total crew of about 35 men.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

No passengers were carried. The freight traffic was smaller than usual as due to low water conditions the seasonal period of navigation was unusually short.

Vessel classification.

Classes.	Number.	Net registered tonnage.
Registered gas	1	16
Unregistered gas	1	
Total	2	16

Freight traffic.

Articles.	Amount in customary units.	Amount in short tons.	Value.	Tonnage for which rates and distances are known.	Average haul on distance freight was carried.	Rate per ton-mile.
					Miles.	
General merchandise	Two 1-ton	1.0	$500	1	25	$0.092
Lumber	11 M feet b. m.	16.5	330	16.5	25	.092
Beans	1,500 sacks	75.0	11,250	75.0	25	.100
Potatoes	777 sacks	42.7	1,515	42.7	25	.080
Total		135.2	13,595	135.2		

APPROPRIATIONS.

United States funds:	
July 27, 1916	$10,000
State of California funds:	
May 2, 1917	10,000
Total	20,000

IMPROVEMENT OF RIVERS AND HARBORS IN THE FIRST PORTLAND, OREG., DISTRICT.

REPORT OF COL. GEORGE A. ZINN, CORPS OF ENGINEERS.

IMPROVEMENTS.

[The letters and figures in parentheses after the titles indicate the group and the numerical order in the group to which the respective improvements belong for purposes of appropriation.]

Page.
1. Coquille River, Oreg. (A1)..... 3351
2. Coos Bay, Oreg. (A2).......... 3354
3. Coos River, Oreg. (A3)......... 3357
4. Siuslaw River, Oreg. (A4)..... 3358
5. Yaquina River, Oreg. (A5) 3360
6. Tillamook Bay, Oreg. (A6)..... 3360
7. Nehalem Bay, Oreg. (A7)...... 3363
8. Cascades Canal, Columbia River, Oreg. (B1)............ 3365
9. The Dalles—Celilo Canal, Oreg. and Wash. (B2)............. 3366
10. Columbia River and tributaries above Celilo Falls to the mouth of Snake River, Oreg. and Wash. (B3)....... 3367
11. Snake River, Oreg., Wash., and Idaho (B4)................. 3370
12. Operating and care of the Cascades Canal............... 3372
13. Operating and care of the The Dalles—Celilo Canal........ 3373

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1719 TO 1762.

COQUILLE, COOS, SIUSLAW, AND YAQUINA RIVERS AND COOS, TILLAMOOK, AND NEHALEM BAYS, OREG. (GROUP A.)

1. COQUILLE RIVER, OREG. (A1).

OPERATIONS DURING THE FISCAL YEAR.

No active operations were carried on, except the removal of the old north jetty receiving wharf opposite Bandon, near the entrance of the river, which was begun on May 17, 1918, with the U. S. bucket dredge *No. 2*, returned from Coos River and operated by a small hired-labor force. The rails from the old jetty tramway were removed and the old piling remaining in the wharf were pulled out. This work was completed June 6, 1918, at a cost of $1,000, including the transfer of the dredge from Coos Bay. After minor repairs were made thereto, the dredge was delivered to the port of Coquille River, to be used in maintaining the navigable channel between Myrtle Point and Coquille City, on June 13, 1918. A survey made on October 29, 1917, shows a controlling depth of 7 feet from Bandon to the outer end of the jetties on a shoal inside of the jetties. A survey of the entrance made in May, 1918, shows a controlling depth of 16 feet on the ocean bar in a channel 300 feet wide and from the end of the jetties to Bandon the depth is generally more than 11 feet, with a controlling depth of 9 feet between the jetties for a short distance at a point about one-half mile from the bar. No work was done on the river above Bandon either by the Government or the port of Coquille. It is reported that some shoaling has taken place, and that there is a controlling depth of about 5½ feet, in a channel 100 feet wide, between Bandon and Coquille, and about 2½ feet, in a channel 50 feet wide, between Coquille and the mouth of the north fork, about 1½ miles below Myrtle Point. Other work for which expenditures are shown consisted of repairs to bucket dredge *No. 2*, repairs to U. S. dredge *Oregon*, which was rented to the port of Vancouver from October 1, 1917, to January 2, 1918, assembling old unserviceable property to be sold, collecting commercial statistics, and caring for the plant. The total expenditures were $5,792.16, of which $1,000 was for new work and $4,792.16 for maintenance.

CONTRACTS IN FORCE.

Name of lessor: A. McNair.
Date of lease: May 16, 1917.
Character: Rent of two office rooms.
Price: $10 per month.
Authorized: June 22, 1916.
Date of beginning: January 20, 1917.
Date of expiration: January 19, 1918.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

COQUILLE RIVER BAR.

Vessel classification.

	Arrived.		Departed.	
	Number.	Tons.	Number.	Tons.
Coastwise: American	158	39,088	157	[illegible]
Passengers	426		323	

Freight traffic.

Articles.	Outbound.		Inbound.	
	Short tons.	Value.	Short tons.	Value.
Butter	0.81	$186.30		
Cheese	84.2	19,306.00		
Chittim bark	16	2,000.00	[illegible]	[illegible]
Coal	40	320.00	[illegible]	[illegible]
Dairy products	724.47	106,628.[illegible]	[illegible]	[illegible]
Empty drums	581.2	[illegible]	[illegible]	[illegible]
Fruit		[illegible]	[illegible]	[illegible]
Gasoline and oil		[illegible]	[illegible]	[illegible]
Grain	[illegible]	[illegible]	[illegible]	[illegible]
Hay	[illegible]	[illegible]	[illegible]	[illegible]
Lumber	[illegible]	[illegible]	[illegible]	[illegible]
Matchwood	[illegible]	[illegible]	[illegible]	[illegible]
Miscellaneous	[illegible]	[illegible]	[illegible]	[illegible]
Oils	[illegible]	[illegible]	[illegible]	[illegible]
Poles	[illegible]	[illegible]	[illegible]	[illegible]
Shingles	[illegible]	[illegible]	[illegible]	[illegible]
Slices } veneering Splints }	[illegible]	[illegible]	[illegible]	[illegible]
Ties	[illegible]	[illegible]	[illegible]	[illegible]
Vegetables	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]

COQUILLE RIVER.

Vessel classification.

Class enrolled and licensed.	American coastwise.	Net tonnage.	Passengers.
Steamers	7	453	42,981
Gasoline	12	129	

Freight traffic.

Articles.	Short tons.	Value.
Cordwood	395	$1,206.00
Coal	2,571	20,568.00
Chittam bark	21.25	2,656.25
Dairy products	858.25	197,397.50
Fruit	59.6	3,725.00
Fish	234.1	51,502.00
Grain	481.1	29,443.82
Hay	287.3	6,320.60
Lumber	12,151.52	145,818.24
Logs	135,557.33	813,343.98
Live stock	71.2	14,240.00
Machinery	167	47,917.00
Matchwood	50	600.00
Miscellaneous	5,220.25	287,113.75
Piles	850	4,080.00
Poles	1,543	7,406.40
Ties	21	252.00
Vegetables	92	3,128.00
Total	160,630.9	1,636,718.04

APPROPRIATIONS.

UNITED STATES FUNDS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 436)		$386,000.00
Present project:		
June 25, 1910	$56,000.00	
Mar. 4, 1913	6,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	26,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	76,000.00	
July 27, 1916	6,000.00	
		170,000.00
Total of appropriations		556,000.00

CONTRIBUTED FUNDS.

Contributed by port of Bandon:		
Feb. 5, 1916	$4,000.00	
Mar. 28, 1916	5,000.00	
	9,000.00	
Refunded to port of Bandon Jan. 30, 1917	108.80	
		8,891.20
Grand total of receipts from all sources		564,891.20

Receipts from sales, etc., $6,221.75.

2. COOS BAY, OREG. (A2).

OPERATIONS DURING THE FISCAL YEAR.

Dredging on Coos Bay Bar, which was in progress at the close of the last fiscal year, was continued with the U. S. dredge *Col. P. S. Michie* until November 20, 1917, when the dredge was transferred to the Columbia River, Oreg., for work in the second Portland district. During that period the dredge worked on the bar on parts of 66 days (actually dredging 472 hours and 20 minutes), and removed 522,953 cubic yards of sand at a field cost of $33,547.40, or a unit cost of 6.4 cents per cubic yard. The dredged material was dumped about 1 mile to seaward of the bar. The dredging work of the season ending November 20, 1917, resulted in securing a channel over the bar 300 feet wide of not less than 30 feet, and a depth of 33 feet in a channel 100 feet wide.

On February 21, 1918, the *Michie* finished work in the second district and was taken to Portland, Oreg., to be overhauled. This work consisted of dry-docking the vessel and cleaning and painting the hull, removing tailshafts, renewing propellers, repairing main engines and pump, and minor repairs to machinery and hull. The greater part of the repair work was done by contract, on a cost plus 15 per cent basis, but considerable work was done by the ship's crew. The cost of the repairs, exclusive of the services of the crew, was $9,837.88. The work was delayed on account of the difficulty in getting skilled labor and suitable material, and all repairs were not finished until June 18, 1918. The *Michie* returned to Coos Bay and resumed operations on the bar on June 19, 1918, dredging parts of seven days, and removed 42,231 cubic yards of sand from the bar, making a total of 565,184 cubic yards removed during the fiscal year.

A survey made on April 26, 1918, shows that the storms during the winter months had shoaled the ocean bar to about its normal condition before any dredging had been done. After the jetty was finished and before dredging began the controlling depth varied between 18 and 22 feet. On April 26, 1918, the controlling depth was 20 feet in a channel 400 feet wide across the ocean bar, and the controlling depth on the shoal about 1 mile inside of the bar (off Coos Head) was 26 feet in a channel 200 feet wide. The shoalest part of the ocean bar was about 1,600 feet on the channel axis, between the 24-foot contours, and about 2,200 feet long between the 30-foot contours. Although the depth of the bar channel has varied from year to year the axis of this channel has been fixed by the construction of the jetty, and only slight variations of the position of the axis have been observed. No work of maintenance was carried on in the bay channels during the year, as the project depth of 18 feet was obtained in September, 1912, and was deepened to 25 feet except at the rock reef off Fossil Point by the port of Coos Bay in 1915. A survey of the bay channel made in April, 1918, shows some deterioration below Coos River, and at the town of Marshfield, in front of the wharves, the channel has shoaled to 12 feet. Below Marshfield the controlling depth is 18 feet and occurs on the rocky reef just above Fossil Point. From the rocky reef to Marshfield the controlling depth is about 20 feet. From the lower end of Marshfield to Smith's Mill the controlling depth in the channel is about 17 feet off Coal Bank Slough. It is estimated that the removal of about 50,000 cubic yards of sand will restore the channel to its project depth of 18 feet. The amount expended was $70,506.33, all for the maintenance of the bar channel, by the operation of the dredge *Michie*, including repairs, office expenses, etc., except $6,000 paid for a parcel of land at Empire, Oreg., to be used for oiling station.

CONTRACTS IN FORCE.

Name of lessor: Annie M. Tower.
Date of lease: December 5, 1916.
Character: Hire of two office rooms at Empire, Oreg.
Price: $10 per month.
Authorized: June 22, 1916.
Date of beginning: September 1, 1916.
Date of expiration: August 31, 1917.
Renewed September 1, 1917, and canceled December 31, 1917.

Name of lessor: Annie M. Tower.
Date of lease: February 18, 1918.
Character: Hire of dwelling for office purposes at Empire, Oreg.
Price: $15 per month.
Authorized: January 25, 1918.
Date of beginning: January 1, 1918.
Date of expiration: December 31, 1918.

Name of contractor: Heiser Machine Works (Inc.).
Date of contract: April 29, 1918.
Character: Repairs to dredge *Col. P. S. Michie*.
Price: Actual cost plus 15 per cent, except flat rates for shopwork.
Date of beginning: April 29, 1918.
Date of expiration: May 28, 1918.
Completed at end of fiscal year: 100 per cent.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Class.	Arrived.		Departed.	
	Number.	Tons.	Number.	Tons.
Coastwise (American):				
Steamers	333	179,826	334	183,503
Sail	2	622	1	392
Gasoline	22	1,880	19	1,418
Barges (towed)	28	41,423	26	38,513
Total	385	223,751	380	224,826
Passengers	2,674	....	2,967	....

Freight traffic.

Articles.	Short tons.	Value.
INBOUND.		
Coastwise:		
Dairy products	39	$8,970.00
Fruit	449	27,962.50
Fish	127	27,940.00
Gasoline, distillate, and coal oil	3,066.18	160,361.21
Grain	2,699	165,178.80
Hay	464	10,208.00
Lumber	25	300.00
Live stock	17	3,400.00
Machinery	2,267	650,629.00
Matchwood	1,060	12,600.00
Miscellaneous	10,505	577,775.00
Oil, fuel	3,380	30,420.00
Vegetables	389	13,226.00
Total	24,477.18	1,688,970.51
OUTBOUND.		
Coastwise:		
Cordwood	42	117.60
Chittam bark	41	4,920.00
Dairy products	496	114,080.00
Fruit	1	62.50
Fish	457	100,540.00
Gasoline and oil	30	1,569.00
Grain	50	3,060.00
Hay	10	220.00
Lumber	416,009	4,992,108.00
Laths and shingles	540	12,744.00
Live stock	22	4,400.00
Machinery	44	12,628.00
Miscellaneous	2,911	160,105.00
Poles	487	2,337.60
Shooks	105	2,604.00
Vegetables	330	11,220.00
Wool and woolen goods	10	10,000.00
Total	421,585	5,432,715.70

Average haul of freight, 400 miles; average haul on portion under improvement, 14 miles.

APPROPRIATIONS.

UNITED STATES FUNDS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 436)		[1] $981,166.76
Present project:		
June 25, 1910	$400,000.00	
Feb. 27, 1911	40,000.00	
Mar. 4, 1913	80,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	70,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	70,000.00	
July 27, 1916	70,000.00	
Aug. 8, 1917	80,000.00	
July 18, 1918	40,000.00	
		850,000.00
Total of appropriations		1,831,166.76

CONTRIBUTED FUNDS.

July 28, 1914	$3,300.00	
Aug. 7, 1914	3,800.00	
Aug. 22, 1914	2,000.00	
Sept. 8, 1914	2,000.00	
		11,100.00
Total of United States and contributed funds		1,842,266.76

Receipts from sales, etc., $32,156.50.

---

[1] Not including $3,000 allotted Apr. 5, 1905, to Coos River and $478.24 unexpended balance of allotment of $5,000 from act of Mar. 3, 1905, which was returned to the Treasury.

3. COOS RIVER, OREG. (A3).

OPERATIONS DURING THE FISCAL YEAR.

After making a survey of both forks of Coos River the U. S. bucket dredge *No. 2* (transferred from Coquille River July 22, 1917), operated by hired labor, began restoring the channel of the south fork on July 23, 1917, beginning at the head of navigation, 8½ miles above the mouth, and worked down to the foot of Carpenters Shoal, a distance of 5½ miles. This work was completed on September 26, 1917. The dredge was then transferred to the north fork, work begun at Allegany, 8½ miles above the mouth, and worked down to the lower end of Pipers Shoal, a distance of 3 miles. A channel 50 feet wide and 4 feet deep at low water on both forks of the river was secured. No work was done on the main river below the forks, as the depth was sufficient for the needs of present navigation. The work was completed on November 20, 1917, and the dredge tied up at Marshfield, but the winter freshets having caused some shoaling at head of navigation on the north fork, the dredge was again worked 17 days, from April 23 to May 10, 1918, restoring the channel to its former depth and width. After making some minor repairs thereto, the dredge was transferred to the Coquille River. The following is a summary of the work done during the fiscal year:

Locality.	Gravel removed.	Sand removed.	Bowlders removed.	Snags removed.
	Cubic yards.	*Cubic yards.*	*Cubic yards.*	*Number.*
South fork	7,282	5,883	150	390
North fork		15,990	35	176
Total	7,282	21,873	185	566

The total expended for the above-mentioned work during the fiscal year was $3,900.85, all for maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Net registered tonnage.	Passengers.
Licensed river steamers	2	137	30,657
Licensed gasoline boats	10	84	
Total	12	221	30,657

Freight traffic.

Articles.	Short tons.	Value.
Cordwood	1,035	$2,898.00
Coal	587	4,696.00
Chittim bark	354	42,480.00
Dairy products	2,435	560,050.00
Fruit	774	48,375.00
Fish	430.5	94,710.00
Grain	1,045	63,954.00
Hay	1,082	23,804.00
Lumber	1,880	22,560.00
Logs (towed)	60,340	362,040.00
Live stock	789	157,800.00
Machinery	3,014	865,018.00
Piles	895	4,296.00
Poles	455	2,184.00
Rock	19,105	19,105.00
Spars	458	2,748.00
Vegetables	1,830	62,220.00
Wool	28	28,000.00
Woolen goods	511	613,200.00
Total	97,047.5	2,980,138.00

Average haul of freight, 10 miles; average haul on portion under improvement, 7 miles.

APPROPRIATIONS.

June 3, 1896	$5,000
Mar. 3, 1899	3,000
June 13, 1902	2,000
Mar. 3, 1905 (allotted Apr. 5, 1905, from "Improvement of Coos Bay and Harbor, general improvement")	3,000
Mar. 2, 1907	3,000
June 25, 1910	3,000
July 25, 1912	3,000
Mar. 4, 1915 (allotted Apr. 2, 1915)	3,000
July 27, 1916	3,000
Aug. 8, 1917	3,000
Total	31,000

4. SIUSLAW RIVER, OREG. (A4).

OPERATIONS DURING THE FISCAL YEAR.

No work was in progress during the year. The contractor finished all work in connection with the jetties in June, 1917, including the removal of his plant. All Government plant used in connection with jetty construction was removed to Portland in July, 1917. A survey of the entrance made in May, 1918, shows a controlling depth of 14 feet at mean lower low water in a channel 400 feet wide. This is an increase of 2 feet in depth and an increase of 250 feet in width over the conditions at the end of the last fiscal year. The total expenditure was $14,518.97, of which $7,760.27 from United States funds and $5,019.13 from contributed funds, was for new work, and $1,739.57 from United States funds for maintenance. The expenditures include final payment on the contract for jetty construction completed the previous fiscal year.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Vessel classification.

	Arrived.		Departed.	
	Number.	Tons.	Number.	Tons.
Coastwise (American):				
Steamers	2	100	2	100
Gasoline	4	138	4	138
Total	6	238	6	238

Freight traffic.

Coastwise.	Inbound.		Outbound.	
	Short tons.	Value.	Short tons.	Value.
Miscellaneous	164.2	$9,081	180	$9,900

APPROPRIATIONS.

UNITED STATES FUNDS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 555)		$187,000.00
Present project:		
June 25, 1910	$50,000.00	
Mar. 4, 1911 (sundry civil act)	50,000.00	
July 25, 1912	5,000.00	
Aug. 24, 1912 (sundry civil act)	35,000.00	
Mar. 4, 1913	5,000.00	
June 23, 1913 (sundry civil act)	80,500.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	5,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	117,500.00	
July 27, 1916	5,000.00	
Aug. 8, 1917	5,000.00	
		358,000.00
Total of appropriations		545,000.00
June 30, 1908, carried to surplus fund of Treasury		24,838.00
Net total		520,162.00

CONTRIBUTED FUNDS.

Funds contributed by the port of Siuslaw (including $100,000 credited for useful work performed)	$215,500.00	
Funds contributed by the port of Siuslaw, June 7, 1915	112,500.00	
		328,000.00
Returned to port of Siuslaw		5,468.41
		322,531.59
Total of United States and contributed funds		842,693.59

Receipts from sales, etc., $2,484.10.

5. YAQUINA RIVER, OREG. (A5).

OPERATIONS DURING THE FISCAL YEAR.

No active operations were carried on during the year. Some shoaling of the channel between the bay and Toledo has taken place, but there was no serious inconvenience to navigation, as the amount of commerce was small. The amount expended during the fiscal year, $16.83, was travel and office expense, charged to maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Class.	American.	Net registered tonnage.	Passengers
Gasoline launches	3	50	900

Freight traffic.

Articles.	Short tons.	Value.
General merchandise	150	$30,000
Cordwood	1,000	3,000
Total	1,150	33,000

The above statistics cover traffic over the river as reported by the ports of Toledo and Newport. The traffic over the Yaquina Bay bar is given as 550 tons of merchandise, fish, and coal, all inbound. No record of outbound commerce is available.

APPROPRIATIONS.

UNITED STATES FUNDS.

Mar. 4, 1913	$28, 800. 00
Mar. 4, 1915 (allotted Apr. 2, 1915)	3, 000. 00
Aug. 8, 1917 (allotment)	3, 000. 00
Total of United States funds	34, 800. 00

CONTRIBUTED FUNDS.

Funds contributed by the port of Toledo (including $37,430.57 credited for useful work performed)	43, 200. 00
Total of United States and contributed funds	78. 000. 00

Received from damages, etc., $49.27.

6. TILLAMOOK BAY AND BAR, OREG. (A6).

OPERATIONS DURING THE FISCAL YEAR.

Active operations, constructing the north jetty at the entrance, which were in progress at the beginning of the year, were continued until October 19, 1917, when all work in connection with the jetty was finished. The contractor placed 22,725 tons of stone in the jetty enrockment during the year, making a total of 428,671 tons placed in the completed jetty. No extension of the jetty tramway was made during the year, as the length of the tramway (to bent No. 380) at the close of the last fiscal year was sufficient to build a high tide jetty 5,700 feet long. The stone delivered was placed in the enrockment between bent No. 355 and the outer end bent No. 380, and was obtained from two quarries on the Miami River, three to four miles from the jetty.

The following material was placed in the jetty by the contractor during the fiscal year:

Stone, quantity, 22,725.46 tons; price, $1.44; total amount, $32,724.66.

The north jetty as constructed is 5,810 feet long. The crest of the enrockment for about 5,700 feet from the shore end of the jetty is above the level of the ordinary high tide, and the outer 110 feet of the enrockment is about 3 feet above the ordinary low tide.

At the close of the active operations the Government plant (track, etc.) was removed from the jetty tramway by the contractor, under force account payment, and later the rails, the jetty pile driver, track scales, and five of the jetty dump cars were sold to the ports of Toledo and Newport for the construction of a jetty on the south side of the entrance to Yaquina Bay, Oreg. The total amount expended in connection with jetty construction was $83,005.59, which included the final payment under the contract, all for new work.

The United States bucket dredge at Tillamook, operated by hired labor, worked in July and August, 1917, and completed the excavation of the 16-foot channel to Bay City. Range piles were driven to mark the 16-foot channel. The cost of operating the dredge was $947. During a portion of August, 1917, the dredge was operated in excavating a basin at Bay City Wharf. The expense, $480, was borne by the local interests. The dredge was also used three days in August to remove 14 large and 32 small snags from Hoquarten Slough, and then was tied up and overhauled. From February 20 to March 3 the dredge was rented to the Spruce Lumber Co. to excavate a logging pond at Bay City, removing 2,222 cubic yards of material, and was then tied up for some minor repairs. The dredge was rented to the port of Tillamook on April 24, 1918, and worked until May 14, excavating a basin 400 feet long, 60 feet wide, and 10 feet deep, to facilitate the launching of a vessel under construction by the Emergency Fleet Corporation at Dicks Point, and then resumed the work of deepening the main project channel between Bay City and Hoquarten Slough for the port, continuing the work until the end of the fiscal year.

A survey of the entrance, made in May, 1918, shows a controlling depth in the bar channel of 22 feet at mean lower low water in a channel 200 feet wide across the ocean bar and a channel from 22 to 35 feet deep and 400 feet wide along the jetty where there was a controlling depth of only 10 feet last year. A survey of the main channel in the bay, made in May, 1918, shows that the 16-foot channel deteriorated and that the controlling depth in the lower end is about 14 feet and 12 feet near the upper end of the cut at Bay City. The 100-foot channel leading to Bay City Wharf and the basin at the wharf, dredged to 16 feet, has shoaled to between 6 and 7 feet. The total expenditure for the foregoing work of operation and repairs of the bucket dredge, surveys, etc., was $6,229.41, of which $947 was for new work and $5,282.41 for maintenance.

CONTRACTS IN FORCE.

Name of lessor: W. W. Leete.
Date of lease: December 5, 1916.
Character: Rent of lot 11, Bar View, Oreg.
Price: $3 per month.
Approved: June 20, 1917.
Date of beginning: September 21, 1916.
Date of expiration: September 20, 1917.
Completed.

Name of contractor: Giebisch & Joplin, Portland, Oreg.
Date of contract: January 5, 1914.
Character: Constructing north jetty at entrance to Tillamook Bay, Oreg.
Approximate quantities (in place), with prices:
  100,000 linear feet of piles, at 20 cents per linear foot.
  500,000 feet b. m. of lumber, at $18 per thousand feet b. m.
  27,000 pounds of driftbolts, at 5 cents per pound.
  850 pairs of fishplates, complete with bolts, at $1 per pair.
  40 tons of steel rails, at $70 per ton of 2,000 pounds.
  84 tons of old rails relaid, at $1.50 per ton of 2,000 pounds.
  9,200 pounds of railroad spikes, at 4 cents per pound.
  3,000 pounds of wire and ship spikes, at 3 cents per pound.
  410,000 tons of stone, at $1.44 per ton of 2,000 pounds.
  4,000 pounds of straps and stirrups, at 6 cents per pound.
  1,000 pounds of bolts, with head, nuts, and washers, at 5 cents per pound.
  640 cords of mattresses, complete, at $5 per cord of 128 cubic feet.
  10 frogs and switches, complete, including guardrails, at $100 each.
  1 only special crossing, complete, $150.
Approved: January 13, 1914.
Date of beginning: March 21, 1914.
Date of expiration: May 21, 1916 (28 months). (Time limit waived for a reasonable period.)
Completed.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Classes.	Arrived.		Departed.	
	Number.	Tons.	Number.	Tons.
Coastwise (American):				
Steamers	1	71	1	71
Gasoline	11	295	10	275
Total	**12**	**366**	**11**	**346**

Freight traffic.

Articles.	Inbound.		Outbound.	
	Short tons.	Value.	Short tons.	Value.
Coastwise:				
Dairy produce			230	$52,900
Fish	94	$20,680	200	44,000
Miscellaneous	530	29,150		
Total	624	49,830	430	96,900

APPROPRIATIONS.

UNITED STATES FUNDS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 567)		[1] $141, 999. 86
Present project:		
July 25, 1912	$105, 000. 00	
Mar. 4, 1913	100, 000. 00	
Mar. 3, 1915 (sundry civil act)	172, 000. 00	
July 1, 1916 (sundry civil act)	35, 000. 00	
July 27, 1916	5, 000. 00	
Aug. 8, 1917 (allotted)	13, 000. 00	
		430, 000. 00
Total of appropriations		571, 999. 86

CONTRIBUTED FUNDS.

Contributed by local interests and guaranteed by the port of Bay City by tripartite agreement dated May 5, 1913	$407, 000. 00	
Deposited by port of Bay City, 1916	3, 300. 00	
Deposited by port of Tillamook, 1916	2, 150. 00	
Deposited by city of Bay City, 1917	4, 750. 00	
		417, 200. 00
Grand total		989, 199. 86

Receipts from sales, etc., $4,335.53.

7. NEHALEM BAY, OREG. (A7).

OPERATIONS DURING THE FISCAL YEAR.

South jetty.—The south jetty was finished in 1915. For a distance of 150 feet from the outer end of the jetty the enrockment has subsided to low-tide level. The remainder of the enrockment, built to high-tide level, has not subsided to any great extent.

North jetty.—At the beginning of the year the jetty tramway was finished to its project end, a distance of 3,975 feet from the receiving wharf. This includes 1,125 feet of tramway approach between the wharf and the jetty. At the close of the last fiscal year the contractor had placed 54,557 tons of stone in the enrockment and the enrockment was continued until December 18, 1917, when a mass of drift, carried down by a freshet in the Nehalem River, lodged against the tramway approach and carried away 575 feet thereof, with six jetty rock cars and the jetty pile driver. The pile driver was completely wrecked and the cars deposited in deep water. The same storm carried away 180 feet of the outer end of the jetty tramway and a number of piles in other places in the tramway. The Government launch was also wrecked, but the machinery was recovered. The pile driver was rebuilt and the tramway repaired while the contractor was opening up a new quarry for delivering stone, as the old quarry was exhausted. The repairs to the jetty and plant were sufficiently finished on April 8, 1918, as to permit the contractor to resume delivery of stone and on April 15, 1918, he again began delivery. During the fiscal year 25,673 tons of stone were delivered, making a total of 80,250 tons delivered to June 30, 1918. About 19,750 tons of stone remains to be delivered to complete the quantity specified, which, it is believed, after making a careful estimate, will be sufficient to complete the jetty. Delivery of stone is progressing slowly on account of the difficulty of getting labor, etc.

---

[1] Does not include $200.14 unexpended balance of allotment from act of Mar. 3, 1909, which was returned to the Treasury.

A survey of the entrance made June 5, 1918, shows a controlling depth of 18 feet in a channel 200 feet wide between the jetties and extending seaward about 1,000 feet from the ends of the jetties. The controlling depth on the ocean bar is 10 feet on a narrow crest across a straight channel about 1,000 feet wide. Although the controlling depth is somewhat less this year, the conditions are better than they were last year on account of the greater channel width and depth between the jetties.

The port of Nehalem has built a small pipe-line dredge and is improving the bay channel. The excavated material is used for filling the lowlands in the vicinity of Wheeler. The total amount expended during the fiscal year was $48,758.05, all for new work, one-half of which was contributed by local interests.

CONTRACTS IN FORCE.

Name of lessor: Pacific Railway & Navigation Co.
Date of lease: April 16, 1918.
Character: Rent of portion of permanent right of way at Brighton, Oreg.
Price: $7.50 per annum.
Authorized: June 20, 1917.
Date of beginning: February 1, 1918.
Date of completion: January 31, 1919.

Name of lessor: The Wright-Blodgett Co. (Ltd.), Portland, Oreg.
Date of lease: February 21, 1918.
Character: 14.85 acres of land at mouth of Nehalem River, Oreg.
Price: $100 per annum.
Approved: June 20, 1917.
Date of beginning: November 1, 1917.
Date of expiration: October 31, 1918.

Name of contractor: Robert Wakefield.
Date of contract: April 11, 1916.
Character: Furnishing 100,000 short tons of stone for jetty construction at shore end of north jetty.
Price: $1.34 per ton of 2,000 pounds, f. o. b. shore end of north jetty.
Date of beginning: July 10, 1916.
Date of expiration: November 10, 1917. (Time limit waived for a reasonable period.)
Completed at end of fiscal year: 80 per cent.

COMMERCIAL STATISTICS.

Season of navigation, year 1917, opened January 1; closed December 31. There was no traffic over the bar during the year. No commercial statistics relating to the river could be obtained.

APPROPRIATIONS.

UNITED STATES FUNDS.

Previous project, Sept. 19, 1890		$10,000.00
Present project:		
July 25, 1912	$100,000.00	
Mar. 4, 1913	100,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	116,175.00	
		316,175.00
Total of appropriations		326,175.00
Returned to surplus fund of Treasury		9,314.32
Net total		316,860.68

CONTRIBUTED FUNDS.

Contributed by local interests and guaranteed by tripartite agreement with the port of Nehalem, dated Apr. 29, 1913 (including $82,000 credited for useful work performed)	316,175.00
Total of United States and contributed funds	633,035.68

CASCADES AND DALLES-CELILO CANALS, OREG.; COLUMBIA RIVER AND TRIBUTARIES ABOVE CELILO FALLS TO THE MOUTH OF SNAKE RIVER, OREG. AND WASH.; AND SNAKE RIVER, OREG., WASH., AND IDAHO (GROUP B).

8. CASCADES CANAL, COLUMBIA RIVER, OREG. (B1).

OPERATIONS DURING THE FISCAL YEAR.

No work was in progress during the fiscal year. The amount reported as expended, $52.45, was for care of plant.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

See report covering operation and care of the Cascades Canal.

APPROPRIATIONS.

Existing project:	
Aug. 14, 1876	$90,000
June 18, 1878	150,000
Mar. 3, 1879	100,000
June 14, 1880	100,000
Mar. 3, 1881	100,000
Aug. 2, 1882	265,000
July 5, 1884	150,000
Aug. 5, 1886	187,500
Aug. 11, 1888	300,000
Sept 19, 1890	435,000
July 13, 1892	326,250
Existing project—Continued.	
Mar. 3, 1893	$1,239,653
June 3, 1896	50,000
June 11, 1896	179,597
Mar. 3, 1899	75,000
June 13, 1902	30,000
Mar. 3, 1905	30,000
Mar. 3, 1905 (allotment)	1,000
June 25, 1910	5,000
Mar. 4, 1913	100,000
	3,914,000

Receipts from sales, etc., $11,695.01.

9. THE DALLES-CELILO CANAL, OREG. AND WASH. (B2).

OPERATIONS DURING THE FISCAL YEAR.

The work consisted of riprapping about 150 feet of river bank at a point about 1½ miles above the lower entrance, where the river had scoured the bank and threatened to undermine the canal embankment. A small construction force was employed in October and November, 1917, for this purpose, and 2,688 cubic yards of loose rock was placed on the slope. A small scow was constructed for general use and for a fuel scow for the dredge *Celilo*. A small force taken from the operating force was used throughout the year collecting and shipping some of the canal construction plant which was sold or transferred to other departments or districts. Only minor repairs (made by the canal operating crew) were necessary during the year. The leakage which gave trouble when the canal was opened to navigation has nearly ceased, and it is believed that no further trouble therefrom will be experienced. The freshet of 1917 deposited considerable sand in the canal, but not enough to interfere with navigation, and was easily removed by dredging. The freshet of 1918 was below the normal height; it has not yet receded, but no apparent damage has been shown and it is believed that the quantity of river deposit will be small. The Oregon State Portage Railway, which was constructed in 1905 for the purpose of transferring freight from The Dalles to Celilo during the construction of The Dalles-Celilo Canal, was sold in September, 1917, and the track and equipment removed. The total expenditure for the fiscal year was $8,239.23, for new work.

CONTRACTS IN FORCE.

Name of lessor: Seufert Bros. Co.
Date of lease: February 1, 1915.
Character: Rent of land for canal purposes at or near Big Eddy, Oreg.
Price: $20 per annum.
Authorized: January 27, 1915.
Date of beginning: February 1, 1915.
Date of expiration: January 31, 1920.

Name of lessor: Lewis Investment Co., Portland, Oreg.
Date of lease: July 1, 1917.
Character: Lease of 16 office rooms.
Price: $270 per month.
Approved: June 20, 1917.
Date of beginning: July 1, 1917.
Date of expiration: June 30, 1918.

COMMERCIAL STATISTICS.

See report on operating and care of The Dalles-Celilo Canal.

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 432)		$370,000.00
Present project:		
Mar. 3, 1905	$50,000.00	
June 30, 1906	250,000.00	
Mar. 2, 1907	100,000.00	
May 27, 1908	336,000.00	
Mar. 4, 1909	164,000.00	
June 25, 1910	600,000.00	
Feb. 27, 1911	600,000.00	
July 25, 1912	700,000.00	
Mar. 4, 1913	1,200,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	525,000.00	
		4,525,000.00
Total of appropriations		4,895,000.00

Receipts from sales, $71,392.31.

10. COLUMBIA RIVER AND TRIBUTARIES ABOVE CELILO FALLS TO THE MOUTH OF SNAKE RIVER, OREG., AND WASH. (B3.)

OPERATIONS DURING THE FISCAL YEAR.

Work was carried on by use of Government plant, consisting of the steamer *Umatilla* and drill boats *Nos. 2* and *3*, operated by hired labor, at the following obstructions in the section of the river under improvement:

Homly Rapids (6 miles below the mouth of Snake River).—The steamer *Umatilla* began operations September 1, 1917, repairing the three wing dams at this place. About 2,693 tons of rock was placed in the dams, most of which was quarried at a point about 7 miles below the rapids. The *Umatilla* also removed about 50 cubic yards of bowlders from the main channel and placed the material in the wing dams. The bowlders were drilled and blasted by drill boat *No. 2*, and removed by the steamer *Umatilla* with a 1-cubic-yard clamshell bucket. About 2,000 tons of rock was also quarried by the *Umatilla* and placed in the wing dams at Homly Rapids. The work was stopped in February, 1918, on account of shortage of funds. During March, 1918, the *Umatilla* was used as a quarter boat on survey of the rapids in the Columbia River, and on March 31, 1918, was placed out of commission to await the next low-water season.

Drill boat *No. 2* was transferred from the Snake River during the latter part of November, 1917, and began work in Homly Rapids December 1, 1917, drilling and blasting bowlders in the main channel of the rapids. About 50 cubic yards of bowlders were blasted, the fragments of which were removed by the steamer *Umatilla*. The drill boat also quarried about 950 tons of rock at the quarry, about 7 miles below the rapids, to be used by the *Umatilla* for repairing wing dams. The drill boat suspended operations on February 15, 1918, on account of shortage of funds, was towed to Kennewick, overhauled, and placed out of commission February 28, 1918, and in March was towed to the Celilo Canal and tied up to await the next low-water season.

Squally Hook Rapids (102 miles below mouth of Snake River).—Drill boat *No. 3* was transferred from Snake River and began work at this place on November 1, 1917. About 88 cubic yards of reef rock was drilled and blasted on the south side of the main channel and the shattered rock deposited into deep water by means of a derrick and a three-fourths yard clamshell bucket. This work was stopped by a freshet on December 20, 1917, and the drill boat taken to the Celilo Canal and placed out of commission to await the next low-water season.

In addition to the foregoing work the *Umatilla* replaced buoys and ranges for the channels through the principal rapids in the river between Celilo Falls and Snake River. On account of the shortage of funds to carry on the work, drill boat *No. 1*, which usually worked in Umatilla Rapids, was used as a quarter boat on surveys of the Columbia and Snake Rivers, and on the completion of the survey work for the season was taken to the Celilo Canal and tied up to await the next working season.

Only one steamboat line operated on this section of river during the year and suspended operations December 15, 1917. This line resumed operations between Portland and Arlington (40 miles above Celilo) on June 26, 1918, but there has been no commercial navigation on this section of river above Arlington since December 15, 1917.

The following is a summary of the work done during the fiscal year:

Locality.	Distance from Snake River.	Rock blasted.	Stone placed in dams.	Rock dredged.
	Miles.	*Cu. yds.*	*Tons.*	*Cu. yds.*
Homly Rapids	6	50	2,693	50
Squally Hook Rapids	102	88		88
Total		138	2,693	138

The total amount expended during the fiscal year for the foregoing work was $22,630.51, of which $2,510.90 was for improvement and $20,119.61 for maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of through navigation, year 1917: Opened February 25; closed December 31, 1917.

Vessel classification.

Licensed river steamers	[1] 8
Net registered tonnage	1,206
Passengers carried	1,502

---

[1] Number of vessels plying the river.

Freight traffic.

Articles.	Short tons.	Value.	Rate per ton-mile.
Agricultural implements	20	$8,000.00	$0.03
Automobiles	476	473,620.00	.0875
Cement and lime	263	3,156.00	.0125
Flour	74	7,992.00	.0125
Fruit	66	4,125.00	.03
Furniture and household goods	63	16,380.00	.05
General merchandise	695	139,000.00	.05
Grains:			
Barley	15	918.00	.015
Oats	....	....	.0178
Wheat	1,998	122,277.60	.0178
Rye	9	550.80	.0178
Hay and feed	189	4,158.00	.015
Junk	9	540.00	.025
Cattle	72	10,800.00	.015
Hogs	32.3	9,609.25	.02
Horses	216.6	55,882.80	.0125
Sheep	5.5	1,056.00	.035
Lumber	306.9	3,682.80	.0109
Salt	858	6,864.00	.0125
Miscellaneous	1,272	69,960.00	.05
Sugar	1,033	144,620.00	.02
Vegetables	36	1,224.00	.02
Wool	155	155,000.00	.035
Total	7,864.3	1,239,416.25	....

Navigation was suspended by ice from January 1 to January 12, and from February 15 to February 25, 1917. Only one steamboat line has been operating on the Columbia River above Celilo to Snake River and this company began operations March 3, 1917, and suspended December 15, 1917, on account of lack of patronage. The steamboat company did not resume operations until June 28, 1918.

APPROPRIATIONS.

UNITED STATES FUNDS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 433)		$120,000.00
Present project:		
Mar. 2, 1907	$120,000.00	
June 25, 1910	90,000.00	
Feb. 27, 1911	25,000.00	
July 25, 1912	50,000.00	
Mar. 4, 1913	60,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	10,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	37,000.00	
July 27, 1916	38,000.00	
Aug. 8, 1917	45,000.00	
		475,000.00
Total of appropriations		595,000.00

CONTRIBUTED FUNDS.

Appropriated by State of Washington	25,000.00
Total of United States and contributed funds	620,000.00

Receipts from sales, $177.90.

11. SNAKE RIVER, OREG., WASH., AND IDAHO (B4).

OPERATIONS DURING THE FISCAL YEAR.

Work was carried on between the mouth of the river and Lewiston, Idaho, a distance of 142 miles. The work was done by Government plant operated by hired labor, and consisted of drilling and blasting reefs and bowlders, and repairing wing dams at the most troublesome points in this section of river. Operations began on August 1, 1917, and were suspended by a freshet on December 21, 1917. On account of shortage of funds the plant was placed out of commission to await a favorable working stage of river. Work was carried on at the following obstructions:

Pine tree Rapids (36 miles from the mouth.)—Drill boat *No. 2* worked from August 1 to November 21, 1917, and drilled and blasted 920 cubic yards of rock reef from the south side of the channel to widen the channel through the rapids. On the last-named date, on account of a rising river, the drill boat was transferred to the Columbia River.

Texas Rapids (66 miles from the mouth).—The U. S. steamer *Asotin* worked at the head of the rapids from August 1 to October 31, and drilled and blasted 897 cubic yards of reef rock to widen the upper entrance to the rapids where there is a rather sharp turn in the channel.

Log Cabin Rapids (107 miles from mouth).—The *Asotin* began work of repairing the wing dam on November 1 and suspended work on account of a rising river on December 21, 1917. About 580 tons of rock was placed in the dam. The *Asotin* went into winter quarters on the last-named date.

On account of shortage of funds work on the river was not resumed in the spring.

Summary of work done during fiscal year.

Location.	Distance from mouth.	Rock blasted.	Rock placed in dams.
	Miles.	*Cu. yds.*	*Tons.*
Pine Tree Rapids	36	920	
Texas Rapids	66	897	
Log Cabin Rapids	107		580
Total		1,817	580

A survey of the river made in August, September, and October, 1917, shows that the controlling depth between the mouth and Riparia is 2 feet (at Long Crossing Bar) and between Riparia and Lewiston 2½ feet (at Log Cabin Island Rapids), at adopted low water (lowest 15-day period). The controlling depths are on the gravel shoals, where no work has been done for several years. The total expenditures for the foregoing work were $16,327.74, of which $8,579.13 was for new work and $7,748.61 for maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of through navigation, year 1917: Opened February 25; closed December 31, 1917.

Vessel classification.

Licensed river steamers	[1] 5
Net registered tonnage	1,539
Passengers carried	1,538

Freight traffic.

Articles.	Short tons.	Value.	Rate per ton-mile.
Agricultural implements	5	$2,000.00	$0.02
Automobiles	7	6,965.00	.015
Barley	19	1,162.80	.0125
Cement and lime	3	36.00	.01
Coal	11	88.00	.015
Cottonseed cake	80	5,360.00	.008
Flour	119	19,332.00	.0125
Furniture and household goods	28	7,280.00	.06
Gasoline and distillate	5	261.50	.04
General merchandise	494	98,800.00	.0257
Hay	95	2,090.00	.015
Hides	8	3,520.00	.0228
Hogs	23	6,842.50	.05
Horses	25	6,450.00	.05
Live stock	5	1,000.00	.05
Lumber	55.2	662.40	.036
Mill feed	22	660.00	.015
Miscellaneous	688	37,840.00	.03
Oats	8,407	514,508.40	.0125
Salt	595	4,760.00	.0085
Shingles	7	165.20	.0045
Sugar	668	93,520.00	.0145
Vegetables	16	544.00	.04
Wheat	46,107	2,821,748.40	.0075
Wool	226	226,000.00	.02
Total	57,718.2	3,772,676.20	....

Average haul of wheat about 20 miles.
Other commodities about 200 miles.

Of the above, 10,754 tons were through freight from the mouth of the river to Lewiston; 46,177 tons were handled by the Oregon Railroad & Navigation Co.'s boats and consisted principally of wheat transferred from points on the left bank of the river between Riparia and a point about 12 miles above Lewiston, where there is no railroad, to the railroad on the right bank of the river below Lewiston. The remaining 787 tons consisted of miscellaneous small freight carried by gasoline boats operating to points above Lewiston.

APPROPRIATIONS.

UNITED STATES FUNDS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 556)		$168,500.00
Present project:		
June 13, 1902	$40,250.00	
June 13, 1902 (emergency allotment)	5,500.000	
June 13, 1902 (transferred from Clearwater River, Idaho)	12,294.41	
Mar. 3, 1905	25,000.00	
Mar. 2, 1907	10,000.00	
Mar 3, 1909:		
Allotted Mar. 30, 1909	5,000.00	
Allotted Oct. 7, 1909	[2] 9,389.59	

---

[1] Number of vessels plying the river.

[2] An allotment of $10,000, of which $601.41 was returned to the Treasury.

Present project—Continued.

June 25, 1910	$25,000.00	
Feb. 27, 1911	15,000.00	
July 25, 1912	25,000.00	
Mar. 4, 1913	25,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	5,000.00	
Mar. 4, 1915 (allotted Apr. 2, 1915)	20,000.00	
July 27, 1916	25,000.00	
Aug. 8, 1917	25,000.00	
		$272,443.00
Total of appropriations		440,943.00

CONTRIBUTED FUNDS.

Appropriated by the State of Washington ($100,000 minus $15,000 which reverted to State treasury)	85,000.00
Total of United States and contributed funds	525,943.00

Receipts from sales, etc., $825.70.

12. OPERATING AND CARE OF THE CASCADES CANAL.

OPERATIONS DURING THE FISCAL YEAR.

The canal was in commission throughout the year. The June freshets did not reach a stage high enough to close the canal to navigation and there was no ice in the river during the winter. Considerable silt was deposited by the freshet of 1917 and the dredge *Cascades* was in commission from October 1, 1917, to January 31, 1918, and removed 46,049 cubic yards of river deposit from the upper and lower entrances to the canal at a cost of $6,566.72, or 14.25 cents per cubic yard. In addition to the usual operation and care of the canal, minor repairs were made to the canal plant.

CONTRACTS IN FORCE.

Name of lessor: Tracy D. Cartland.
Date of lease: December 28, 1917.
Character: Hire of tug *Lydia Anne.*
Price: $16.50 per day.
Authorized: October 31, 1917.
Date of beginning: October 1, 1917.
Lease completed: March 31, 1918.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Closed January 1 to 5 and 19 to 22, inclusive, on account of ice; closed June 19 to 21 on account of high water; otherwise navigation continuous.

Summary of vessels locked through canal.

Classes.	Passages.	Lockages.	Net registered tonnage.	Passengers.
Licensed river steamers	1,027	1,220	377,130	38,387
Gasoline boats	245			
Barges and sail boats	48			
Rafts	24			
Total	1,344	1,220	377,130	38,387

Freight traffic.

Articles.	Short tons.	Value.	Rate per ton-mile.
Berries and fruits	5,480	$342,500.00	$0.025
Cattle	504.5	756,750.00	.025
Flour	3,843.4	415,087.20	.0187
Hay	576.72	12,687.84	.0187
Horses	1,399.2	360,993.60	.021
Lumber	2,306.1	27,673.20	.025
Miscellaneous, grain	1,268.5	77,632.20	.0187
Live stock	82.35	20,587.50	.031
Merchandise	21,738.58	4,347,716.00	.063
Salmon	155.50	34,210.00	.063
Sheep	24.95	4,790.40	.05
Wheat	2,572	157,406.40	.0187
Wool	183.1	183,100.00	.0375
Total	40,134.9	6,741,134.34	....

The average haul on river, of commerce passing through the canal, is 80 miles.

EXPENDITURES.

	Amount authorized.	Amount expended.
Office expenses, superintendence	$15,000.00	$8,967.60
Labor operating and maintenance	6,000.00	6,547.66
Materials for repairs	500.00	379.89
Tools, oils, fuel, etc	500.00	110.14
Total for year	22,000.00	16,005.29

The difference in the total amount authorized and the expenditures is due to the omission of the work of sand-blasting and painting lock gates, for which $5,000 was estimated, and to the increased cost of labor.

Total expenditures to March 4, 1915 (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 481)	$189,751.05
1915 (March 4 to June 30)	2,983.13
1916	12,234.65
1917	13,422.80
1918	16,005.29
Total	234,396.92

13. OPERATING AND CARE OF THE DALLES-CELILO CANAL.

OPERATIONS DURING THE FISCAL YEAR.

The canal was in commission throughout the year. The June freshets did not reach a stage high enough to close the canal to navigation and there was no ice in the river during the winter. Considerable sand was deposited by the freshet of 1917 and the dredge *Celilo* was in commission from August 1, 1917, to February 1, 1918, and removed 28,505 cubic yards of river deposit from the canal, at a cost of $5,954.83, or 20.9 cents yer yard. In addition to the usual operation and care of the canal, minor repairs were made to the canal and plant. The canal-operating crew was used at times for some construction work and for collecting and shipping construction plant that was sold or transferred during the year. Only one steamboat line used the canal during the year, and suspended operations on December 15, 1917. This line resumed operations on June 26, 1918, with one boat making two round trips a week between Portland and Arlington, Oreg., 40 miles above the canal.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Closed on account of ice January 1 to 11 and 15 to 25; otherwise navigation was continuous.

Summary of vessels locked through the canal.

Classes.	Passages.	Lockages.	Net registered tonnage.	Passengers.	Delays to vessels.		
					Number.	Hours.	Minutes.
Licensed river steamers	96	87	40,440	1,286	13	76	56
Gasoline boats	3						
Barges and sailboats	3						
Total	102	87	40,440	1,286	13	76	56

Freight traffic.

Articles.	Short tons.	Value.	Rate per ton-mile.
Berries and fruit	67.03	$4,189.38	$0.02
Cattle	79	11,850.00	.015
Flour	84.39	9,114.12	.0125
Hay	22.03	726.66	.0125
Horses	193.8	50,000.40	.0125
Lumber	217.2	2,606.40	.010
Miscellaneous grain	122.8	7,515.36	.0125
Live stock	45.75	11,437.50	.02
Merchandise	2,417.4	483,480.00	.05
Sheep	8.5	1,632.00	.035
Wheat	1,893.6	115,988.32	.0125
Wool	156.52	156,520.00	.085
Total	5,308.02	855,060.14	

Rate per ton-mile, figured on average haul of 200 miles.

Average haul on portion of river under improvement, 8¾ miles; average haul of freight passing through canal, about 200 miles.

EXPENDITURES.

	Amount authorized.	Amount expended.
Office expenses, superintendence, and contingencies	$4,000	$3,168.7
Labor (operation and maintenance, including dredging)	22,300	15,396.2
Materials for repairs	2,200	1,713.2
Tools, oil, fuel, supplies, etc. (general)	2,200	1,735.9
Tools, oil, fuel, supplies, etc. (dredge)	2,300	2,517.5
Total for year	33,000	24,526.6

The difference in the total amount authorized and the expenditure is due to using a smaller operating force than was estimated and t using the operating force for canal construction work at times. Th actual cost of materials and supplies was somewhat less than the expenditures, as there was considerable coal and other supplies on hand at the beginning of the fiscal year.

The total expenditures are as follows:

1915, Apr. 1 to June 30	$3, 810. 33
1916	25, 618. 23
1917	24, 159. 25
1918	24, 526. 68
Total	78, 114. 49

IMPROVEMENT OF RIVERS AND HARBORS IN THE SECOND PORTLAND, OREG., DISTRICT.

REPORT OF COL. GEORGE A. ZINN, CORPS OF ENGINEERS.

IMPROVEMENTS.

[The letters and figures in parentheses after the titles indicate the group and the numerical order in the group to which the respective improvements belong for purposes of appropriation.]

Page.
1. Columbia River at the mouth, Oreg. and Wash. (A1) 3377
2. Columbia and Lower Willamette Rivers below Vancouver, Wash., and Portland, Oreg. (A2) 3381
3. Clatskanie River, Oreg. (B1) ... 3389
4. Willamette River above Portland, and Yamhill River, Oreg. (B2) 3390
5. Willamette River at Willamette Falls, Oreg. (B3) 3393
6. Lewis River, Wash. (B4) 3394
7. Cowlitz River, Wash. (B5) 3395
8. Grays River, Wash. (B6) 3397
9. Operating and care of canal and locks at Willamette Falls, Oreg 3399
10. Operating and care of lock and dam in Yamhill River, Oreg 3400

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1762 TO 1794.

1. COLUMBIA RIVER AT THE MOUTH, OREG. AND WASH. (A1).

OPERATIONS DURING THE FISCAL YEAR.

The work consisted in dismantling, segregating, listing, and the care and transfer of plant and materials used in connection with the construction of the north jetty.

The U. S. dredge *Chinook* operated on the bar from July 1 to October 19 and from May 7 to the end of the fiscal year. During the winter months the dredging gear, hull, and machinery of the dredge were overhauled and repaired. The dredge worked 16 hours a day with two shifts, and removed a total of 1,071,933 cubic yards of sand from the main channel over an area extending 1,320 feet on each side of the main channel range. Of this amount, 208,428 cubic yards (new work) were dredged at a unit cost of $0.0879; total field cost, $18,326.16, and 863,505 cubic yards (maintenance) were dredged at a unit cost of $0.1462; total field cost, $126,323.12.

During May and June, when conditions on the bar were unfavorable for dredging, the *Chinook* worked at Flavel Shoal in the estuary. For details of work in the estuary, see report on Columbia and Lower Willamette Rivers below Vancouver, Wash., and Portland, Oreg.

Quantity of material dredged monthly from the bar.

Month.	Number of days dredge worked.	Cubic yards bin measurement.	Month.	Number of days dredge worked.	Cubic yards bin measurement.
1917.			1918.		
July	22	353,605	May	5	63,010
August	16	157,340	June	14	208,428
September	16	160,805			
October[1]	15	128,745	Total	88	1,071,933

[1] Dredging operations were suspended for the winter October 19.

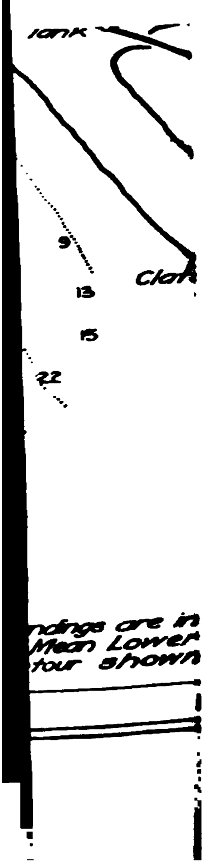
Operating expenses of dredge "Chinook."

Dredged on bar 88 days ... cubic yards	1,071,933
Dredged in estuary 39 days ... do	406,966
Total	1,478,899
Pay roll	$47,620.87
Fuel oil consumed, 36,003.88 barrels, $1.15 to $1.97 per barrel	$60,792.85
Fresh water	$150.00
Laundry, ice, etc.,	$474.10
Subsistence supplies	$11,256.53
Engine-room supplies	$3,689.83
Miscellaneous supplies	$3,277.05
Renewals or additions to outfit	$1,685.69
Ordinary repairs:	
Hull	$6,083.87
Machinery	$4,464.35
Extraordinary repairs:	
Hull	$1,790.45
Machinery	$1,343.78
Coal for galley	$469.17
Cost of operation launch *Papoose*	$1,550.74
Field cost of operation	$144,649.28
Office expenses, engineering, and contingencies	$9,690.00
Total cost of operation	$154,339.28
Total number of cubic yards removed	1,478.899
Field cost per cubic yard	$0.09780
Amount chargeable to bar dredging	$135,887.96
Field cost per cubic yard on bar	$0.125836

Surveys of the bar were made in September, 1917, and in April and June, 1918, at a field cost of $2,600. The survey of June, 1918, shows a controlling depth at mean lower low water of 42 feet across the bar, and a channel 40 feet deep, 2,000 feet wide, parallel with the main channel range and 2,700 feet wide perpendicular to the 40-foot contours. For survey of June, 1917, completed shortly after the close of the fiscal year, see map herewith.

An examination of the outer end of the north jetty was made in June, and for a distance of about 1,400 feet the stone in the enrockment on the south slope has flattened down, and near the end of the jetty the stone has settled from 2 feet to 16 feet in places.

A total of $878.63 was received during the fiscal year account expenditures for other appropriations, etc., which was deducted from


lank
9
13
15
22
Clar
ndings are in
Mean Lower
tour shown

expenditures of the previous year; $763.55 was expended during the fiscal year for the same purpose, of which $492.17 was repaid and the balance, $244.38, is reimbursable.

CONTRACTS IN FORCE.

LEASES.

Lessee: Columbia River Packers' Association, Astoria, Oreg.
Date of lease: April 27, 1916.
Dates of approval: Chief of Engineers, May 22, 1916; Assistant Secretary of War, May 25, 1916.
Date fixed for commencement: May 1, 1916.
Date fixed for completion: Automatically expires April 30, 1919.
Character: Lease for three years of certain United States land on Sand Island, mouth of Columbia River, Oreg. and Wash.
Price: $14,154 per annum.

Lessee: Tallant-Grant Packing Co., Astoria, Oreg.
Date of lease: April 27, 1916.
Dates of approval: Chief of Engineers, May 22, 1916; Assistant Secretary of War, May 25, 1916.
Date fixed for commencement: May 1, 1916.
Date fixed for completion: Automatically expires April 30, 1919.
Character: Lease for three years of certain United States land on Sand Island, mouth of Columbia River, Oreg. and Wash.
Price: $2,125 per annum.

Lessee: Stuart Davis, Chinook, Wash.
Date of lease: April 27, 1916.
Dates of approval: Chief of Engineers, May 22, 1916; Assistant Secretary of War, May 25, 1916.
Date fixed for commencement: May 1, 1916.
Date fixed for completion: Automatically expires April 30, 1919.
Character: Lease for three years of certain United States land on Sand Island, mouth of Columbia River, Oreg. and Wash.
Price: $675 per annum.

COMMERCIAL STATISTICS.

For detailed statement see report on Columbia and Lower Willamette Rivers below Vancouver, Wash., and Portland, Oreg.

Season of navigation, year 1917: Opened January 1; closed December 31.

Summary of traffic over Columbia River bar.

Vessels.	Number.	Total net registered tonnage.
Inbound from:		
Foreign ports	24	32,653
Domestic ports	854	1,173,426
Total	878	1,206,079
Outbound to:		
Foreign ports	30	31,706
Domestic ports	906	1,157,408
Total	936	1,189,114
Grand total	1,814	2,395,193

Summary of traffic over Columbia River bar—Continued.

Freight and passengers.	Freight.		Passengers.
	Short tons.	Value.	Number.
Inbound from:			
Foreign ports	25,312	$2,438,624	....
Domestic ports	1,189,789	49,402,718	28,657
Total	1,215,101	51,841,342	28,657
Outbound to:			
Foreign ports	233,434	6,415,522	....
Domestic ports	909,328	36,900,205	32,008
Total	1,142,762	43,315,727	32,008
Grand total	2,357,863	95,157,069	60,665

Average haul, foreign, 7,000 miles; domestic, 800 miles.

APPROPRIATIONS.

UNITED STATES FUNDS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 432)		[1] $1,993,180.00
Present project:		
June 6, 1900	[2] $250,000.00	
June 13, 1902	[2] 500,000.00	
Mar. 3, 1903	[2] 1,000,000.00	
Mar. 3, 1905	400,000.00	
Apr. 23, 1906	400,000.00	
June 30, 1906	300,000.00	
Mar. 2, 1907	750,244.00	
May 27, 1908	1,450,000.00	
Mar. 3, 1909 (allotted Apr. 20, 1909)	700,000.00	
Mar. 4, 1909	250,000.00	
June 25, 1910	1,200,000.00	
Feb. 27, 1911	950,000.00	
July 25, 1912	1,000,000.00	
Mar. 4, 1913	1,000,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	1,000,000.00	
Mar. 4, 1915 (allotted Apr. 1, 1915)	1,500,000.00	
July 27, 1916	1,200,000.00	
		13,850,244.00
Total of appropriations		15,843,424.00

CONTRIBUTED FUNDS.

Contributed by port of Portland	$475,000.00	
Contributed by port of Astoria	25,000.00	
		500,000.00
Total of United States and contributed funds		16,343,424.00

Receipts from sales, etc., $39,860.37.

---

[1] Does not include $50,000 transferred to improvement below Tongue Point (river and harbor act of June 3, 1896.)

[2] Appropriated for repairs and prosecution of jetty work pending adoption of definite project. Report of Board of Engineers dated Jan. 24, 1903, was adopted by the river and harbor act of Mar. 3, 1905.

2. COLUMBIA AND LOWER WILLAMETTE RIVERS BELOW VANCOUVER, WASH., AND PORTLAND, OREG. (A2).

OPERATIONS DURING THE FISCAL YEAR.

Operations during the fiscal year consisted in dredging on maintenance under the existing project, with U. S. dredges *Multnomah*, *Wahkiakum*, *Clatsop*, *Chinook*, and *Col. P. S. Michie*, and on new work with the *Wahkiakum* in Cathlamet channel; also in the construction of three new dikes, one at Slaughters and two at Henrici Bar; repairs to revetment of Coon Island; repairs to plant at United States moorings; surveys; and dredging operations by the port of Portland.

The U. S. dredge *Multnomah* worked at Henrici, St. Helens, Hunter, Dobelbower, and Eureka Bars, excavating 1,781,800 cubic yards on maintenance at a unit cost of $0.0528. The U. S. dredge *Wahkiakum* worked at Dobelbower, Slaughters, Walker Island, Pancake Point, Puget Island, and Skamokawa Bars, excavating 1,521,050 cubic yards on maintenance at a unit cost of $0.045, and on new work in Cathlamet channel excavating 211,540 cubic yards at a unit cost of $0.028. This dredge was also hired out to the Standifer Construction Corporation to make a fill for a shipyard at Vancouver, Wash., on which work the excavation was 378,510 cubic yards. The U. S. dredge *Clatsop* worked on maintenance at Upper Sands, Tongue Point, No. 2 Beacon, Harrington Point, Pancake Point, and Walker Island Bars, excavating 1,677,338 cubic yards at a unit cost of $0.0591. The U. S. dredge *Chinook*, when conditions were not suitable for dredging at the mouth of the Columbia River, worked on maintenance at Flavel Bar, excavating 406,966 cubic yards at a unit cost for operation of $0.0215. The U. S. dredge *Col. P. S. Michie* was transferred November 20 from the First Portland, Oreg., district and dredged on maintenance on Flavel Bar, excavating 458,847 cubic yards at a unit cost of $0.081.

The total excavation for all United States dredges was 6,057,541 cubic yards, of which 211,540 cubic yards was new work and 5,846,001 cubic yards, maintenance. The total cost of dredging during the year was $317,621.60, of which $5,984.34 was for new work and $311,637.26 for maintenance.

Table No. 1, herewith, gives details of this work, and tables Nos. 2, 3, and 4 are summaries of costs for dredges *Multnomah*, *Wahkiakum*, and *Clatsop*, respectively.

A total of $12,174.33 was expended during the fiscal year account dredging for private parties, transfers between appropriations, etc., of which $1,465.24 was repaid and the balance, $10,709.09, is reimbursable.

The dike constructed at Slaughters Bar is 1,740 feet long, and is located about three-fourths of a mile below the dike constructed last year. It starts from the Oregon shore and extends into the river at right angles, with the object of reducing the width of the river and continuing the effect of the dike above it. Construction is of two rows of piling, close together and staggered. The shore and bottom are protected with riprap. Cost of this dike was $22,270.31.

The two dikes at Henrici Bar were built on opposite sides of the river for the purpose of contraction. They are built of piling pro-

tected with stone, and the shores are riprapped. The dike
Oregon side of the river is 900 feet, and on the Washington
feet in length, and cost $20,186.44 and $10,308.95, respectively
cost of new dikes was $52,765.70.

On repairs to Coon Island revetment 3,857.67 cubic yards
was placed on bank protection, and 1,846 cubic yards of grad
done, at a total cost of $7,014.01. Materials for all these wo
purchased under sealed proposals and work was done with
ment plant and hired labor.

Work at the United States moorings consisted in making
and alterations for plant in the district. The cost of wor
moorings has been included in costs for various pieces of p
gaged on the improvement.

Surveys were made in the Columbia River before and afte
ing at all bars, and were extended to make continuous sheets
deep water as well as the bars from Portland to Mayger, Ore
55 miles.

TABLE No. 1.—*Work done by U. S. dredges "Multnomah," "Wahkiaku sop," "Chinook," and "Col. P. S. Michie" during the fiscal year en 30, 1918.*

Location.	Period at work.	Material dredged.		Least depth at low water.		Le of
		New work.	Maintenance.	Before.	After.	
Dredge Multnomah:		*Cu. yds.*	*Cu. yds.*	*Feet.*	*Feet.*	*F*
Henrici Bar	Aug. 1 to Oct. 16		482,900	23	30	8
Hunter Bar	Oct. 17 to Jan. 9		606,500	22	30	9
Dobelbower Bar	Jan. 10 to Feb. 13		242,400	25	30	5
St. Helens Bar	Feb. 14 to Mar. 8		149,300	25	30	3
Eureka Bar	Mar. 4 to Apr. 13		350,700	25	33	6
Dredge Wahkiakum:						
Slaughters Bar	July 26 to Oct. 4		683,650	19	30	11
Dobelbower Bar	Oct. 5 to Nov. 19		401,510	22	30	12
Walker Island	Nov. 20 to Dec. 10		135,000	25	30	4
Cathlamet Channel	Dec. 11 to Jan. 4	211,540		4	10	4
Puget Island Bar	Jan. 5 to Jan. 27		199,480	26	30	5
Skamokawa Bar	Jan. 27 to Feb. 4		25,000	26	30	1
Pancake Point Bar	Feb. 5 to Feb. 14		76,410	26	30	1
Dredge Clatsop:						
No. 2 Beacon Bar	July 2 to 21		190,613	24½	26½	8
Tongue Point Bar	July 23 to 29 Sept. 17 to Nov. 30		421,562	21½	30	5
Pancake Point Bar	July 30 to Aug. 10		130,942	21	27	...
Walker Island Bar	Aug. 13 to Sept. 15		243,761	22	26	...
Upper Sands Bar	Dec. 1 to Feb. 16		482,078	24	30	6
Harrington Point Bar	May 31 to June 30		208,382	22	28½	3
Dredge Chinook, Flavel Bar.	May 7 to June 30		406,966	29½	30	10
Dredge Col. P. S. Michie, Flavel Bar.	Nov. 24 to Feb. 21		458,847	26½	29½	...
Total		211,540	5,846,001			107

TABLE No. 2.—*Cost of dredging by U. S. dredge "Multnomah" durin year ending June 30, 1918.*

Material dredged .... cubic yards..

Wages, subsistence, supplies, repairs, renewals, etc........
Hog fuel consumed in boilers, at 30 and 40 cents per 100 cubic feet..
Fuel oil consumed by tender, at $1.10 to $1.87 per barrel........
Office expenses, superintendence, surveys, etc........

Total expense........

Field cost per cubic yard dredged		$0.0465
Total cost per cubic yard dredged		$0.0528
Cost per cubic yard for hog fuel		$0.0038
Average amount dredged per day working (i e., 186)	cubic yards	9,580
Excavation by dredge *Multnomah* since placed in commission Apr. 10, 1914:		
Total to June 30, 1917	cubic yards	6,862,445
Total for fiscal year ending June 30, 1918	do	1,781,800
Grand total	do	8,644,245

TABLE No. 3.—*Cost of dredging by U. S. dredge "Wahkiakum" during fiscal year ending June 30, 1918.*

Material dredged	cubic yards	1,732,590
Wages, subsistence, supplies, repairs, renewals, etc		$59,149.24
Hog fuel consumed in boilers, at 30 and 40 cents per 100 cubic feet		$5,678.35
Fuel consumed by tender, at $1.10 to $1.87 per barrel		$2,174.42
Office expenses, superintendence, surveys, etc		$11,318.59
Total expense		$78,320.60
Field cost per cubic yard dredged		$0.0392
Total cost per cubic yard dredged		$0.0452
Total cost per cubic yard for hog fuel		$0.00327
Average amount dredged per day working (i. e., 157)	cubic yards	11,035
Excavation by dredge *Wahkiakum* since placed in commission Apr. 20, 1914:		
Total to June 30, 1917	cubic yards	6,678,858
Total for fiscal year ending June 30, 1918	do	1,732,590
Total on project work	do	8,411,448
Dredged for shipyard fill during fiscal year	do	378,510
Grand total	do	8,789,958

TABLE No. 4.—*Cost of dredging by U. S. dredge "Clatsop" during fiscal year ending June 30, 1918.*

Material dredged	cubic yards	1,677,338
Wages, subsistence, supplies, repairs, etc		$53,813.29
Fuel oil consumed, 21,892.27 barrels, at $1.10 to $1.87 per barrel		$34,007.34
Office expenses, superintendence, surveys, etc		$11,391.06
Total expense		$99,211.69
Field cost per cubic yard dredged		$0.0523
Total cost per cubic yard dredged		$0.0591
Oil consumed per cubic yard dredged, barrels		$0.0130
Cubic yards dredged per barrel of oil	cubic yards	76.61
Cubic yards dredged per working day	do	8,182.13
Excavation by dredge *Clatsop* since her construction in 1909:		
Total to June 30, 1917	cubic yards	16,492,711
Total for fiscal year ending June 30, 1918	do	1,677,338
Grand total	do	18,170,049

Dredging done by the port of Portland in the Columbia and Willamette Rivers, the cost of which was borne by the commission, was as follows:

Location.	Dredges.	Depth to which dredged.	Excavation.
		Feet.	*Cu. yds.*
Columbia River:			
Morgan Bar	Willamette and Tualatin	30	561,294
Willow Bar	Columbia and Tualatin	32	216,128
Willamette River below Portland	Willamette, Tualatin, Columbia, and Portland.	30	2,062,155
Total			2,839,577

The surveys made show that new dikes constructed at Henrici, Martin Island, and Slaughters Bars have had a very beneficial effect on the channel. Dredging alone has proved to be ineffective in maintaining the channels, and it is evident that dike construction at all points where necessary should be undertaken as soon as funds can be made available.

The summer freshet in the Columbia River reached its crest June 27 at a height of 19.2 feet on the Portland gage, and an abnormal winter freshet in January reached a height of 19 feet. These freshets caused considerable shoaling on the bars in the Columbia River and it is expected considerable maintenance dredging will be needed during the coming season.

CONTRACTS IN FORCE.

LEASE.

Lessor: George W. Sanborn, Astoria, Oreg.
Date of lease: June 3, 1915.
Date of approval: Renewal of lease. Original lease authorized June 20, 1912.
Date fixed for commencement: August 1, 1915.
Date fixed for completion: Automatically expires July 31, 1918.
Character: Lease of portion of one dock.
Price: $30 per month.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Seagoing vessels.	Under American flag.	Under foreign flag.	Total.	Total net registered tonnage.
INBOUND.				
From foreign ports:				
Steamers	1	9	10	18,33
Sailing	13	1	14	14,31
From domestic ports:				
Steamers	677	12	689	1,088,68
Gasoline	105		105	15,96
Sailing	59	1	60	68,77
Total	855	23	878	1,206,07
OUTBOUND.				
To foreign ports:				
Steamers	7	2	9	13,62
Sailing	19	2	21	18,08

Vessel classification—Continued.

Seagoing vessels.	Under American flag.	Under foreign flag.	Total.	Total net registered tonnage.
OUTBOUND—continued.				
To domestic ports:				
Steamers	744	....	744	1,077,055
Gasoline	107	....	107	10,862
Sailing	55	....	55	69,491
Total	932	4	936	1,189,114
Total inbound	855	23	878	1,206,079
Total outbound	932	4	936	1,189,114
Total in and outbound	1,787	27	[1] 1,814	2,395,193
INLAND VESSELS.				
Freight and passenger	....	....	25	5,225
Towing	....	....	49	7,487
Total	....	....	[2] 74	12,71

[1] Arrivals and clearances.

[2] Number of vessels operated.

Passenger traffic.

Inbound from domestic ports	28,657
Outbound to domestic ports	32,008
	60,665
Inland, in addition to above	265,834
Total	326,499

Freight traffic.

Articles.	Short tons.	Value.
INBOUND.		
Foreign imports:		
Coal	113	$549
Coffee	50	11,600
Copra	10,142	1,178,803
Equipment for vessels	46	92,744
Fiber	632	155,648
Hides	108	52,289
Miscellaneous	11,657	641,108
Oil, nut	22	4,835
Rice	1,156	82,446
Seeds	579	109,453
Sulphur	600	10,469
Tea	207	98,680
Total	25,312	2,438,624
Domestic:		
Asphaltum	17,558	333,602
Automobiles	396	394,020
Bags and burlap	1,181	342,490
Barley	55	2,750
Butter	229	185,261
Cement	21,793	207,034
Cheese	198	34,947
Coal	3,689	29,512
Coffee	2,594	887,148
Dairy products	100	23,000
Electrical goods	1,000	318,000
Fish	307	67,540
Flour	42,916	4,634,928
Fruits, dried	3,012	150,600
Fruits and vegetables, fresh	12,571	628,550
Fruits and vegetables, canned	6,929	1,073,995
Furniture and household goods	207	53,820
Gasoline and distillate	126,048	6,592,310
Hardware	2,829	529,023
Iron and steel, all kinds	4,856	412,760
Lead	213	42,600
Leather and hides	174	76,734

Freight traffic—Continued.

Articles.	Short tons.	Value.
INBOUND—continued.		
Domestic—Continued.		
Machinery, boilers, castings, etc	1,903	$546,161
Magnesite	1,209	24,180
Meats, fresh and cured	818	290,390
Merchandise and miscellaneous	63,989	12,797,800
Milk, condensed	8,432	579,168
Mill feed and mill products	1,647	49,410
Oil, fuel	791,018	7,040,060
Paper	97	7,566
Paints and oils	4,624	924,800
Plaster	3,814	21,954
Powder	628	147,188
Rice	1,021	142,940
Salmon, canned	3,096	764,712
Salt	11,954	179,310
Sugar	48,000	7,968,000
Sulphur	551	35,815
Tin plate	385	30,800
Wines and liquors	1,996	79,840
Wool	752	752,000
Total	1,189,789	49,402,718
Grand total	1,215,101	51,841,342
OUTBOUND.		
Foreign exports:		
Flour	1,477	157,086
Lead	25	4,850
Lumber, including ties	153,014	1,801,601
Machinery	22	6,454
Milk, condensed	174	39,270
Miscellaneous	32,066	176,365
Oatmeal	2,644	253,193
Wheat	44,012	3,976,703
Total	233,434	6,415,522
Domestic:		
Automobiles	444	441,780
Bags and burlap	684	198,360
Barley	2,376	118,800
Butter	400	323,600
Cheese	500	88,250
Coal	701	5,608
Dairy products	300	69,000
Electrical goods	406	129,008
Fish	901	198,200
Flour	18,826	2,033,208
Fruit, dried	100	5,000
Fruits and vegetables, fresh	5,173	258,650
Fruits and vegetables, canned	1,157	179,335
Furniture and household goods	1,123	291,980
Hay	252	5,544
Hardware	1,860	374,820
Hops	322	161,000
Iron and steel, all kinds	1,428	121,380
Leather and hides	1,890	833,490
Logs	128,000	768,000
Lumber	533,795	6,405,540
Machinery, boilers, castings, etc	1,655	474,985
Meats, fresh and cured	4,606	1,635,130
Merchandise and miscellaneous	69,278	13,855,600
Milk, condensed	543	94,482
Mill feed and mill products	31,060	931,800
Oats	17,280	864,000
Paper	38,824	3,028,272
Paints and oils	227	45,400
Plaster	106	1,166
Potatoes	3,254	111,636
Powder	200	47,200
Salmon, canned	22	5,434
Seeds	299	65,285
Staves and shooks	7,451	186,275
Wheat	33,689	2,459,297
Wines and liquors	117	4,690
Wool	79	79,000
Total	909,328	36,900,205
Grand total	1,142,762	43,315,727

Freight traffic—Continued.

INLAND, IN ADDITION TO FOREGOING.

Articles.	Short tons.	Value.	Rates per ton-mile. Carload and special.	Rates per ton-mile. Less than carload.
Agricultural implements and vehicles	1,056	$422,400	$0.0463	$0.0129
Alum	677	20,310	....	....
Asphalt	380	7,334	.0343	.0428
Automobiles	4,562	4,539,190	....	.0856
Brick	60,421	259,810	.0256	.0343
Coal	2,057	16,456	.0256	.0343
Dairy products: Milk, cream, butter, eggs, cheese, etc.	4,509	1,037,070	.0651	.0754
Fish	10,192	2,242,240	.0256	.0343
Flour	4,012	433,296	.0240	.0514
Fruit	5,640	352,500	.0514	.0856
Furniture and household goods	2,895	752,700	.0376	.0856
Gasoline and distillate	2,112	110,458	.0343	.0514
Grain, all kinds	11,611	710,593	.0240	.0514
Hay	11,968	263,296	.0343	.0428
Hides	405	178,200	.0514	.0685
Iron and steel, all kinds	8,230	669,550	.0343	.0428
Lime, plaster, and cement	4,548	54,576	.0256	.0428
Live stock:				
Horses	4,446	1,147,068	.0428	.0600
Cattle	3,082	462,300	.0514	.0600
Sheep	201	38,592	....	.0514
Hogs	356	105,910	....	.0428
Logs (towed)	2,488,710	14,932,260	.0060	....
Lumber, including ties	61,881	742,572	.0240	.0266
Machinery, boilers, etc	5,192	1,490,104	.0428	.0685
Magnesite	489	9,780	.343	.514
Meats, fresh and cured	1,220	433,100	.0411	.0600
Merchandise	28,278	5,655,600	....	.0514
Mill feed	11,959	358,770	.0240	.0514
Millwork: Sash, doors, etc	443	34,554	.0343	.0656
Oil, fuel (barged)	224,962	2,002,162	.0084	....
Paper	40,088	3,126,864	.0343	.0514
Piling (towed)	90,589	434,827	.0144	....
Pipe, fittings and plumbing goods	1,644	457,032	.0428	.0514
Potatoes, onions and other vegetables	9,180	312,120	.0343	.0514
Pulp	28,154	1,830,010	.0343	.0514
Sand and gravel (barged)	387,570	193,785	.0168	....
Sewer pipe and tiling	1,614	25,824	.0343	.0428
Shingles	15,198	358,673	.0240	.0343
Stone (barged)	749,289	374,644	.0120	....
Sulphur	252	16,380	.0343	.0514
Wood (barged)	24,976	69,933	.0192	....
Wool	1,145	1,145,000	.0428	.0685
Miscellaneous	10,482	576,510	....	.0514
Total	4,326,681	48,404,353	....	....

SUMMARY.

Vessels.	Arrived.	Departed.	Total net registered tonnage.
Foreign ports	24	30	64,359
Domestic ports	854	906	2,330,834
Total	878	936	2,395,193
Inland vessels operated, 74			12,714

Freight and passengers.	Freight. Short tons.	Freight. Value.	Passengers. Number.
From foreign	25,312	$2,438,624	....
From domestic	1,189,789	49,402,718	28,657
To foreign	233,434	6,415,522	....
To domestic	909,328	36,900,205	32,008
Inland, in addition to above	4,326,681	48,404,353	265,834
Total	6,684,544	143,561,422	326,499

Average haul over portion of river under improvement, 100 miles; total average haul, rivers and oceans, exports and imports, 7,000 miles; domestic, 800 miles; local rivers, 50 miles.

APPROPRIATIONS.

Columbia and Willamette Rivers below Portland, Oreg.

UNITED STATES FUNDS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 430)		$2,720,365.00
Existing project:		
July 25, 1912	$180,000.00	
Aug. 24, 1912	200,000.00	
Mar. 4, 1913	160,000.00	
June 23, 1913	120,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	200,000.00	
Mar. 4, 1915 (allotted Apr. 1, 1915)	450,000.00	
July 27, 1916	360,000.00	
Aug. 8, 1917 (allotted Sept. 4, 1917)	310,000.00	
July 18, 1918	250,000.00	
		2,230,000.00
Total of United States funds		4,950,365.00

CONTRIBUTED FUNDS.

Contributed by port of Portland	16,819.82
Total of United States and contributed funds	4,967,184.82

Mouth of Willamette to Vancouver.

UNITED STATES FUNDS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 432)		$110,000.44
Present project:		
Mar. 3, 1905	$30,000.00	
Mar. 30, 1906	13,000.00	
Mar. 3, 1909 (allotted Mar. 30, 1909)	5,000.00	
June 25, 1910	10,000.00	
Feb. 27, 1911	3,000.00	
		61,000.00
Total of appropriations		171,000.44
Returned to surplus fund of Treasury	1,869.05	
Withdrawn for reallotment elsewhere	13,000.00	
		14,869.05
Net total of appropriations		156,131.39

CONTRIBUTED FUNDS.

Contributed by the port of Vancouver	7,500.00
Grand total of receipts from all sources	5,130,816.21

Receipts from sales, etc., $9,502.05.

8. CLATSKANIE RIVER, OREG. (B1).

OPERATIONS DURING THE FISCAL YEAR.

No Government plant was available and no work was done until in June when the U. S. dredge *Monticello* and plant was transferred, June 28, from the Lewis River to the Clatskanie River, and from the channel between Clatskanie and the railroad bridge, about three-fourths of a mile, removed, for maintenance, 960 cubic yards of material at a unit cost of $0.2284; total field cost, $219.26.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.	Number.	Total net registered tonnage.
Inland freight and passenger	1	367
Inland towing	2	561
Total	3	928

Passengers carried, 2,142.

Freight traffic.

Articles.	Short tons.	Value.	Rates per ton-mile.	
			Carload and special.	Less than carload.
Agricultural implements and vehicles	61	$24,400	$0.0374	$0.0525
Automobiles	38	37,810	....	.0899
Brick	52	224	.0281	.0374
Coal	33	264	.0281	.0374
Dairy products: Milk, cream, butter, eggs, cheese, etc.	30	6,900	....	.0675
Fish	36	7,920	....	.0374
Flour	21	2,268	.0262	.0450
Fruit	84	5,250	.063	.0749
Furniture and household goods	479	124,540	.0468	.0749
Grain, all kinds	166	10,159	.0262	.0468
Hay	542	11,924	.0374	.0468
Hides	12	5,280	....	.0525
Iron and steel, all kinds	40	3,400	.0374	.0468
Lime, plaster and cement	12	144	.0374	.0468
Live stock:				
Horses	1,583	408,414	.0468	.0624
Cattle	850	127,500	.0562	.0749
Sheep	94	18,048	.0562	.0749
Hogs	91	27,072	.0562	.0749
Logs (towed)	301	1,806	.0063	....
Lumber, including ties	75	900	.0281	.0374
Machinery, boilers, etc	85	24,395	....	.1125
Meats, fresh and cured	6	2,130	.0468	.0749
Merchandise	397	79,400	....	.0749
Millfeed	41	1,230	.0262	.0468
Millwork: Sash, doors, etc	56	4,368	.0374	.0749
Oil, fuel (barged)	4,377	39,044	.0072	....
Potatoes, onions and other vegetables	416	14,144	.0337	.0525
Shingles	5,400	127,440	.0374	.0749
Miscellaneous	546	30,030	....	.0749
Total	15,924	1,146,404	....	....

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 428)		$13,000.00
Existing project:		
June 25, 1910	$5,200.00	
July 25, 1912	1,000.00	
Mar. 4, 1915 (allotted Apr. 1, 1915)	1,000.00	
July 27, 1916	1,000.00	
Aug. 8, 1917 (allotted Sept. 4, 1917)	1,000.00	
July 18, 1918 (allotted Aug. 8, 1918)	1,000.00	
		10,200.00
Total		23,200.00
Reverted to surplus fund (act of Mar. 4, 1909)		324.53
Net total		22,875.47

Receipts from sales, etc., $820.23.

4. WILLAMETTE RIVER ABOVE PORTLAND AND YAMHILL RIVER, OREG. (B2.)

OPERATIONS DURING THE FISCAL YEAR.

Operations during the fiscal year consisted in dredging and snagging the Willamette and Yamhill Rivers, repairs to dams and dikes, and construction of a new hull for the dipper dredge *Champoeg*.

Dredging by the "Mathloma" during the fiscal year 1918.

Name of bar.	Distance above Portland	Material removed.	Name of bar.	Distance above Portland	Material removed
	Miles.	*Cu. yds.*		*Miles.*	*Cu. yds.*
Willamette River:			Willamette River—Continued		
Oregon City locks, entrance to	13	35	Eola	75½	2,392
Ash Island	38	7,662	Grey Eagle	77	3,963
Rays	41	1,641	Budds Chute	79½	4,264
Yamhill entrance	41½	1,072	Yamhill River:		
Baughmans	44	1,619	Snells	44	681
Weston	46	847	Dayton slide	46½	582
Smiths	55¼	2,293	Berry slide	48	2,862
Eldridge	56½	1,822	Martins Bend	48¼	1,280
Fletchers	57½	2,935	Yamhill lock	49½	3,396
Lower Matheneys	58	1,165	Total		47,050
Lone Tree	61	872			
Simons	62	1,207			
Lincoln	65	4,460			

Field cost about 12.9 cents per cubic yard, total $6,064.72.

The *Mathloma* also removed 194 snags from the channel and 326 trees from the banks of the Willamette River, and 165 snags and 285 trees from the Yamhill River, at a unit cost of $2.88 per obstruction; total cost, $2,791.52.

The United States boat pile driver and crew completed repairs to the Wheatland Dam, placing 1,054 cubic yards of rock and driving 127 piles, at a field cost of $4,537.32, unit cost $3.87 per cubic yard of rock placed and $3.63 per pile driven.

The pile driver also drove 35 piles in repairing dikes, etc., at a field cost of $377.85, or about $10.80 per pile driven.

A total of $54.90 was expended and reimbursed during the fiscal year account loan of pile driver and crew for private work.

Work was begun on the construction of a new hull for the dipper dredge *Champoeg*. At the end of the year the hull was completed, the old house and machinery had been transferred to the new hull, and the entire work was about 90 per cent complete. The cost of this work was $13,370.18.

Following is a summary of operations on the upper Willamette and Yamhill Rivers for the fiscal year 1918:

Combined dredge and snag boat "Mathloma" (1½-yard grab bucket).

Overhanging trees removed		611
Snags removed from channel		859
Material dredged	cubic yards	47,050
Total length of cuts	linear feet	12,189
Actual time dredging	hours	580
Time towing and snagging	do	267
Time moving, taking wood, repairs, etc	do	679
Working time laid up	do	1,216
Cordwood consumed	cords	263
Average monthly cost of operation		$1,800

U. S. floating pile driver "No. 3."

Total number of piles driven		200
Total number of hours pile driving		76
Rock placed,	cubic yards	1,054

During the fiscal year, 34,210 cubic yards of gravel were removed by private parties from the Willamette River in the vicinity of Ross Island, 2 miles above Portland, for commercial purposes.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Total net registered tonnage.
Inland freight and passenger	6	1,904
Inland towing	25	5,309
Total	31	7,213

Passengers carried. 6,088.

Freight traffic.

Articles.	Short tons.	Value.	Rates per ton-mile.	
			Carload and special.	Less than carload.
Agricultural implements and vehicles	47	$18,800	$0.0314	$0.0428
Asphalt	32	608	.02	.0371
Automobiles	572	569,140	....	.1286
Brick	221	950	.0171	.0371
Coal	134	1,072	.0171	.0371
Dairy products: Milk, cream, butter, eggs, cheese, etc.	217	49,910	....	.0514
Fish	81	17,820	....	.0514
Flour	1,941	209,628	.0214	.0257
Fruit	262	16,375	.0286	.0457
Furniture and household goods	645	167,700	....	.0686
Grain, all kinds	7,245	443,394	.0214	.0257
Hay	1,142	25,124	.0214	.0243
Hides	37	16,280	....	.0429
Hops	449	224,500	.0429	.0514
Iron and steel, all kinds	1,414	120,190	.0314	.0371
Lime, plaster, and cement	1,732	20,784	.02	.0371
Live stock:				
Horses	521	134,418	.0654	....
Cattle	328	49,200	.0786	....
Sheep	4	768	.1143	....
Hogs	9	2,678	.0714	....
Logs (towed)	198,501	1,191,006	.006	....
Lumber, including ties	2,605	31,260	.02	.0216
Machinery, boilers, etc	663	190,281	.0314	.06
Magnesite	312	6,240	.0314	.0429
Meats, fresh and cured	68	24,140	....	.0371
Merchandise	7,221	1,444,200	....	.06
Mill feed	1,622	48,660	.0214	.0257
Millwork: Sash, doors, etc	20	1,560	.0314	.0429
Oil, fuel (barged)	72,297	643,443	.007	....
Paper	62,242	4,854,876	.0314	.0429
Pipe, fittings, and plumbing goods	102	28,356	.0314	.0371
Potatoes, onions, and other vegetables	1,961	66,674	.0214	.0286
Pulp	34,404	2,236,260	.019	....
Sand and gravel (barged)	77,806	38,903	.014	....
Sewer pipe and tiling	31	496	....	.0514
Shingles	201	4,744	.02	.0286
Sulphur	734	47,710	.0314	.0371
Wood (barged)	817	2,288	.019	....
Wool	27	27,000	.0871	.0514
Miscellaneous	13,234	727,870	....	.06
Total	491,901	13,705,306	....	....

On May 6, 1918, the Oregon City Transportation Co., Portland, Oreg., operating one steamboat of 200 tons and two of 150 tons capacity, discontinued service after 32 years continuous operation on the upper Willamette River. High cost of labor and materials and lack of business was given as the reason for failure.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 578)		$248,500.00
Existing project:		
June 3, 1896	$40,000.00	
June 4, 1897	[1] 160,000.00	
June 6, 1900 (allotted from emergency act)	5,000.00	
June 13, 1902	68,000.00	
Apr. 28, 1904 (allotted June 3, 1904)	12,000.00	
Mar. 3, 1905	50,000.00	
Mar. 2, 1907	60,000.00	
Mar. 3, 1909 (allotted Mar. 30, 1909, and Mar. 9, 1910)	25,000.00	
July 25, 1910	60,000.00	
Feb. 27, 1911	20,000.00	
July 25, 1912	32,000.00	

---

[1] Of this amount, $3,000 was transferred by river and harbor act of Mar. 3, 1899, t and expended on Long Tom River, Oreg.

Existing project—Continued.

Mar. 4, 1913	52,000.00	
Mar. 4, 1913 (allotted Jan. 19, 1914)	2,000.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	25,500.00	
Mar. 4, 1915 (allotted Apr. 1, 1915)	25,000.00	
July 27, 1916	47,000.00	
Aug. 8, 1917 (allotment)	36,300.00	
		$719,800.00
Total		968,300.00

Receipts from sales, etc., $1,541.31.

5. WILLAMETTE RIVER AT WILLAMETTE FALLS, OREG. (B3).

OPERATIONS DURING THE FISCAL YEAR.

The concrete wall separating the water supplied to the power plants from the lock canal was completed, 4,154 cubic yards being placed, at a cost of $30,230.92, during the fiscal year. A total of 9,175 cubic yards of concrete, at a cost of $131,241.92, have been placed in this wall, which is 1,227 feet in length, varying in height from 12 to 55 feet. Unit costs per cubic yard of concrete placed were as follows:

Concrete materials	$2.30
Concrete mixing and placing	.76
Form work	.57
Cofferdams	2.07
Dredging and excavating for foundation (rock)	3.19
Plant and appliances	2.58
Overhead, office, and miscellaneous	2.84
Total cost per cubic yard	14.31

Excavation for deepening the locks and canal was begun in Lock No. 1 and its approach, which were coffered and 3,454 cubic yards of rock removed in the dry at a field cost of $4.76 per cubic yard. Subaqueous rock excavation was started in the canal basin and lower entrance to the locks, and 3,138 cubic yards of rock removed at a field cost of $6.21 per cubic yard.

The old lock gates were removed and replaced by seven pairs of new wooden gates, at an average field cost of $2,452.82 per pair.

CONTRACTS IN FORCE.

Contractor: Standard Portland Cement Corporation, San Francisco, Cal.
Date of contract: November 9, 1915.
Date of approval: November 23, 1915.
Date fixed for commencement: February 21, 1916.
Date fixed for completion: About December 10, 1917.
Quantity and character: Approximately 10,000 barrels of cement.
Unit price: $1.40 per barrel.
Completed: April 20, 1918.

COMMERCIAL STATISTICS.

For commercial statistics see report on "Operating and care of canal and locks at Willamette Falls, Oreg."

APPROPRIATIONS.

BY FEDERAL GOVERNMENT.

June 25, 1910	$300,000	
Aug. 8, 1917	80,000	
		$380,000

BY STATE OF OREGON.

Feb. 23, 1909	300,000	
		300,000
Total		680,000

6. LEWIS RIVER, WASH. (B4).

OPERATIONS DURING THE FISCAL YEAR.

Dredging operations for maintenance were carried on with the U. S. dredge *Monticello* from December 26 to March 19, at La Center, Charcoal Bend, Hardts, Lone Rock, Shutie, Jennie Creek, and Thornton Bars on the East Fork below La Center, and at the mouth of the river. A total of 52,741 cubic yards of material was removed at a unit cost of $0.103; total field cost of $5,436.76.

From April 1 to 25, the *Monticello* dredged on the North Fork at Woodland, new work, and removed 16,240 cubic yards of material at a unit cost of $0.107; total field cost, $1,741.34.

The construction, new work, of three single pile jetties on the left bank of the river near Woodland, and of four jetties on the right at Bratton Bend, was carried on from April 26 to June 20, when operations were suspended on account of high water. Four hundred and thirty-six piles were driven and 946 cubic yards of stone placed for bank protection at the end of jetties, at a total field cost of $7,737.06.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Total net registered tonnage.
Inland freight and passenger	1	6
Inland towing	4	80
Total	5	86

Passengers carried, 1,536.

Freight traffic.

Articles.	Short tons.	Value.	Rates per ton-mile.	
			Carload and special.	Less than carload.
Agricultural implements and vehicles	25	$10,000	....	$0.0455
Asphalt	2	38	....	.0455
Automobiles	10	9,950	....	.08
Brick	21	90	....	.0382
Coal	30	240	....	.0455
Dairy products: Milk, cream, butter, eggs, cheese, etc	200	46,000	....	.1106
Fish	10	2,200	....	.1212
Flour	20	2,160	....	.0455
Fruit	100	6,250	....	.1212
Furniture and household goods	51	13,260	....	.1212
Gasoline and distillate	42	2,197	....	.0606
Grain, all kinds	25	1,530	....	.0455
Hay	360	7,920	....	.0455
Hides	5	2,200	....	.0606
Iron and steel, all kinds	100	8,500	....	.0455
Lime, plaster, and cement	50	600	....	.0455
Live stock:				
Horses	72	18,576	....	.1264
Cattle	300	45,000	....	.1515
Sheep	10	1,920	....	.0909
Hogs	80	2,580	....	.0785
Logs (towed)	19,833	118,998	$0.007	....
Lumber, including ties	1,667	20,004	....	.0545
Machinery, boilers, etc	10	2,870	....	.1515
Meats, fresh, and cured	250	88,750	....	.1212
Merchandise	500	100,000	....	.1212
Millfeed	1,000	30,000	....	.0455
Millwork: Sash, doors, etc	5	390	....	.0909
Potatoes, onions, and other vegetables	300	10,200	....	.0455
Sewer pipe and tiling	80	1,280	....	.0606
Sulphur	1	65	....	.1221
Wool	3	3,000	....	.1212
Miscellaneous	100	5,500	....	.1221
Total	25,262	562,268	....	....

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 476)		$30,350
Existing project:		
Mar. 4, 1913 (allotted Apr. 11, 1913)	$10,000	
Oct. 2, 1914 (allotted Oct. 7, 1914)	2,000	
Mar. 4, 1915 (allotted Apr. 1, 1915)	10,500	
July 27, 1916 (allotted Aug. 16, 1916)	11,500	
Aug. 8, 1917	13,500	
Aug. 8, 1917 (allotted Sept. 4, 1917)	4,500	
July 18, 1918	13,500	
July 18, 1918 (allotted Aug. 8, 1918)	4,500	
		70,000
		100,350

Receipts from sales, etc., $832.22.

7. COWLITZ RIVER, WASH. (B5).

OPERATIONS DURING THE FISCAL YEAR.

Dredging operations, for maintenance, were carried on with the U. S. dredge *Monticello* from September 19 to October 23, and from March 20 to 30, at Huntington, Monticello, Olson, Hill, and Kelso

Bars below Kelso. A total of 29,700 cubic yards of material
moved at a unit cost of $0.129; total field cost, $3,833.59.

A single pile and rock dike, maintenance, was constructec
the head of Wiley Slough on the left bank of the river near the
The dike is 636 feet in length and was completed in Novemk
unit cost of $10.37; total field cost, $6,597.42.

During January and February 31 snags were removed, foı
tenance, from the channel below Toledo at a unit cost of $8.1
field cost, $252.14.

A total of $909.55 was expended account material and lab
nished to other appropriations, and adjustment was made by tı
of funds.

During the fiscal year the Silver Lake Lumber Co. dred
Clarks Bar and in the vicinity of Rocky Point, between Kel
Ostrander, at a cost of $1,447.50.

Following is a summary of the work done by the *Monticel*
plant:

Distance moved	miles
Material moved (sand)	cubic yards
Material moved (stone)	do
Total length of cut	linear feet
Actual time dredging	hours
Time sluicing	do
Time moving, general repairs, etc	do
Fuel consumed (oil)	barrels
Snags removed by boat	
Snags removed by blasting	
Piles driven in jetty (Wiley Slough)	
Rock placed in jetty (Wiley Slough)	cubic yards

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 3

Vessel classification.

Classes.	Number.	Tot regis ton
Inland freight and passenger	2	
Inland towing	5	
Total	7	

Passengers carried, 4,181.

Freight traffic.

Articles.	Short tons.	Value.	Rates per ton-mile.	
			Carload and special.	Less than carload.
Agricultural implements and vehicles	47	$18,800		$0.0531
Automobiles	106	105,470		.1587
Brick	12	52		.0835
Coal	12	96		.0442
Dairy products: Milk, cream, butter, eggs, cheese, etc.	22	5,060		.0708
Fish	156	34,320		.0442
Flour	114	12,312		.0442
Fruit	40	2,500		.0531
Furniture and household goods	168	43,680		.0884
Grain, all kinds	369	22,583	$0.0265	.0442
Hay	837	7,414	.0265	.0442
Hides	18	7,920		.0531
Iron and steel, all kinds	60	5,100		.0442
Lime, plaster, and cement	135	1,620		.0442
Live stock:				
Horses	71	18,318		.0738
Cattle	76	11,400		.0884
Sheep	1	192		.0531
Hogs	3	892		.0442
Logs (towed)	288,246	1,729,476	.0069	
Lumber, including ties	6,486	77,832	.0230	.0818
Machinery, boilers, etc	52	14,924		.1062
Meats, fresh and cured	1	355		.0442
Merchandise	1,112	222,400		.0442
Mill feed	188	5,640	.0265	.0442
Oil, fuel	3	27		
Piling (towed)	4,036	19,373	.0161	
Pipe, fittings, and plumbing goods	19	5,282		.0442
Potatoes, onions, and other vegetables	540	18,360		.0442
Sewer pipe and tiling	2	32		.0442
Shingles	8,435	199,066	.0265	
Wood	45	126		
Miscellaneous	80	4,400		.0442
Total	310,992	2,595,022		

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 437)		$52,650.00
Existing project:		
June 25, 1910 (allotted Aug. 4, 1910)	$31,600.00	
July 25, 1912 (allotted Sept. 3, 1912)	3,000.00	
Mar. 4, 1913 (allotted Apr. 11, 1913)	13,500.00	
Oct. 2, 1914 (allotted Oct. 7, 1914)	4,000.00	
Mar. 4, 1915 (allotted Apr. 1, 1915)	4,500.00	
July 27, 1916 (allotted Aug. 16, 1916)	6,000.00	
Mar. 4, 1915 (allotted Aug. 8, 1917)	5,000.00	
Aug. 8, 1917 (allotted Sept. 4, 1917)	6,000.00	
July 18, 1918 (allotted Aug. 8, 1918)	6,000.00	
		79,600.00
Total		132,250.00

Receipts from sales, etc., $1,420.22.

8. GRAYS RIVER, WASH. (B6).

OPERATIONS DURING THE FISCAL YEAR.

No work was done as no Government plant was available.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Classes.	Number.	Total net registered tonnage.
Inland freight and passenger	2	166
Inland towing	1	285
Total	3	451

Passengers carried, 12,000.

Freight traffic.

Articles.	Short tons.	Value.	Rates per ton-mile.	
			Carload and special.	Less than carload.
Agricultural implements and vehicles	125	$40,000		$0.0909
Automobiles	8	7,960		.1545
Brick	24	108		.1364
Coal	15	120		.1364
Dairy products: Milk, cream, butter, eggs, cheese, etc.	400	92,000		.1818
Flour	160	17,280		.0909
Fruit	10	625		.1545
Furniture and household goods	250	65,000		.0909
Gasoline and distillate	46	2,406		.0909
Grain, all kinds	30	1,836		.0909
Hay	400	8,800		.0909
Hides	12	5,280		.0909
Iron and steel, all kinds	1,000	85,000	$0.0909	.1364
Lime, plaster, and cement	500	6,000		.0909
Live stock:				
Horses	15	3,870		.1515
Cattle	25	3,760		.1818
Hogs	5	1,488		.1136
Logs (towed)	22,130	132,780	.005	
Lumber, including ties	1,667	20,004	.0341	.1551
Machinery, boilers, etc	1,000	287,000		.0909
Meats, fresh and cured	200	7,100		.1136
Merchandise	800	160,000		.0909
Mill feed	500	15,000		.0909
Millwork: Sash, doors, etc	50	3,900		.1364
Paper	5	390		.0909
Pipe, fittings, and plumbing goods	50	13,900		.1364
Potatoes, onions, and other vegetables	500	17,000		.0909
Sand and gravel (barged)	75	38		.0909
Sewer pipe and tiling	25	400		.2273
Shingles	965	22,774	.0341	
Miscellaneous	100	5,500		.1136
Total	31,092	1,027,304		

APPROPRIATIONS.

Existing project:

Mar. 2, 1907	$2,500
June 25, 1910	500
Feb. 27, 1911	500
Mar. 4, 1913	500
July 27, 1916	500
Aug. 8, 1917 (allotted Sept. 4, 1917)	500
July 18, 1918 (allotted Aug. 8, 1918)	500
Total	5,500

9. OPERATING AND CARE OF CANAL AND LOCKS AT WILLAMETTE FALLS, OREG.

OPERATIONS DURING THE FISCAL YEAR.

During the year the locks have been operated, the canal and locks kept in repair, the grounds policed, and the Government plant and property cared for.

The locks were operated 1,652 times, were closed 84 days on account of construction work, improvement of Willamette River at Willamette Falls, and 15 days on account of high water. The locks were available for traffic during the remainder of the year.

Summary of expenditures made in operating and caring for canal and locks in Willamette River, Oreg., during the fiscal year ending June 30, 1918.

[Submitted in compliance with river and harbor act of July 5, 1884, and as amended by sec. 6 of the river and harbor act of Mar. 3, 1909.]

Office expenses, superintendence, and contingencies	$384.39
Labor	4,495.78
Materials for repairs, etc	1,185.77
Tools, oil, etc	17.88
Total	6,083.82

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Number of lockages	1,652
Total net registered vessel tonnage through locks	479,836
Passengers	4,499

Freight traffic.

Articles.	Short tons.	Value.
Agricultural implements and vehicles	31	$12,400
Asphalt	38	722
Automobiles	570	567,150
Brick	158	679
Coal	156	1,246
Dairy products: Milk, cream, butter, eggs, cheese, etc	157	51,810
Flour	1,298	140,184
Fruit	165	10,312
Furniture and household goods	436	113,100
Grain, all kinds	5,197	318,056
Hay	975	21,450
Hides	2	880
Hops	475	237,500
Iron and steel, all kinds	1,206	102,510
Lime, plaster, and cement	2,158	25,896
Live stock:		
Horses	527	135,966
Cattle	181	27,150
Sheep	9	1,728
Logs (towed)	7,038	42,228
Lumber, including ties	3,050	36,600
Machinery, boilers, etc	842	241,654
Magnesite	61	1,220
Meats, fresh and cured	18	6,390
Merchandise	3,502	700,400
Mill feed	1,917	57,510
Millwork: Sash, doors, etc	2	156
Paper	53,906	4,204,668
Piling (towed)	17,150	82,320
Pipe, fittings, and plumbing goods	70	19,460
Potatoes, onions, and other vegetables	1,462	49,708

Freight traffic—Continued.

Articles.	Short tons.	Value.
Pulp	4,710	$306,150
Sand and gravel (barged)	1,785	892
Sewer pipe and tiling	6	96
Shingles	81	1,912
Stone (barged)	180	90
Sulphur	1,304	84,760
Wood (barged)	162	454
Wool	2	2,000
Miscellaneous	2,968	163,240
Total	113,954	7,770,647

EXPENDITURES.

Fiscal year 1915	$344.22
Fiscal year 1916	4,750.08
Fiscal year 1917	5,149.01
Fiscal year 1918	6,083.82
Total	16,327.13

10. OPERATING AND CARE OF LOCK AND DAM IN YAMHIL RIVER, OREG.

OPERATIONS DURING THE FISCAL YEAR.

During the year the lock has been operated, the lock and dam kept in repair, the grounds policed, and the Government plant and property cared for.

The lock was operated 84 times, was closed to traffic on account of high water 62 days, and was available for traffic during the remainder of the year.

Summary of expenditures made in the operating and caring for lock and dam in Yamhill River, Oreg., during the fiscal year ending June 30, 1918.

[Submitted in compliance with river and harbor act of July 5, 1884, as amended by sec. 6 of the river and harbor act of Mar. 5, 1909.]

Office expenses, superintendence, and contingencies	$196.44
Labor	880.69
Materials for repairs, etc	201.14
Tools, oil, etc	2.20
Total	1,280.47

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Number of lockages	84
Total net registered vessel tonnage through lock	7,464
Passengers	17

Freight traffic.

Articles.	Short tons.	Value.
Automobiles	9	$8,955
Brick	2	9
Flour	4	432
Furniture and household goods	1	260
Grain, all kinds	472	28,886
Hay	44	968
Lime, plaster and cement	52	624
Live stock—Cattle	7	1,050
Logs (towed)	60	360
Merchandise	23	4,600
Mill feed	237	7,110
Millwork—Sash, doors, etc	30	2,340
Piling (towed)	1,038	4,982
Wood	1	3
Miscellaneous	52	2,860
Total	2,032	63,439

EXPENDITURES.

Fiscal year—	
1901	$2,313.40
1902	22,479.27
1903	4,067.33
1904	1,256.21
1905	922.13
1906	1,801.63
1907	1,656.14
1908	1,687.10
1909	1,188.66
1910	1,025.89
1911	$999.20
1912	895.53
1913	1,300.33
1914	867.79
1915	966.29
1916	1,177.72
1917	1,266.16
1918	1,280.47
Total	47,151.30

IMPROVEMENT OF RIVERS AND HARBORS IN THE SEATTLE, WASH., DISTRICT.

REPORT OF MR. W. T. PRESTON, DISTRICT ENGINEER.

IMPROVEMENTS.

[The letters and figures in parentheses after the titles indicate the group and the numerical order in the group to which the respective improvements belong for purposes of appropriation.]

	Page.
1. Willapa River and Harbor, Wash. (A1)	3403
2. Grays Harbor and bar entrance, Wash. (A2)	3404
3. Grays Harbor, inner portion, between Aberdeen and the entrance to said harbor, and Chehalis River, Wash. (A3)	3406
4. Hoquiam River, Wash. (A4)	3406
5. Puget Sound and its tributary waters, Wash. (B1)	3407
6. Waterway connecting Port Townsend Bay and Oak Bay, Wash. (B2)	3408
7. Olympia Harbor, Wash. (B3)	3409
8. Tacoma Harbor, Wash. (B4)	3410
9. Lake Washington Ship Canal, Wash. (B5)	3416
10. Snohomish River, Wash. (B6)	3423
11. Skagit River, Wash. (B7)	3425
12. Swinomish Slough, Wash. (B8)	3426
13. Bellingham Harbor, Wash. (B9)	3427
14. Columbia River, between Wenatchee and Kettle Falls, Wash. (B10)	3428
15. Operating and care of Lake Washington Ship Canal, Wash	3429
16. Polson Bay, Flathead Lake, Mont	3431
17. Apoon Mouth of Yukon River, Alaska (C1)	3431
18. Nome Harbor, Alaska (C2)	3432

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1795 TO 1839.

WILLAPA RIVER AND HARBOR, CHEHALIS AND HOQUIAM RIVERS, WASH. (GROUP A).

1. WILLAPA RIVER AND HARBOR, WASH. (A1).

OPERATIONS DURING THE FISCAL YEAR.

No work was done during the fiscal year ending June 30, 1918. The sum of $839.92 was expended for inspections, etc., and charged to maintenance under the previous project.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Net registered tonnage.	Passengers.
Registered:			
Steamers	118	110,648	17,673
Sailing	13	14,156	
Unregistered rafts	333		
Total	464	124,804	17,673

Freight Traffic.

Articles.	Amount in customary units.	Amount in short tons.	Valuation.
Agricultural implements	1 ton	1	$210
Ice	11 tons	11	220
Box shooks	2,227 tons	2,227	47,604
Brick	3,600 bricks	9	29
Cement	84 barrels	16	192
Clams, canned	1,030 cases	36	5,150
Coal	24 tons	24	108
Fish, fresh	174 tons	174	26,100
Fish, canned	6,506 cases	228	39,125
Flour, feed, and grain	10,650 sacks	426	21,300
Fruit and vegetables	174 tons	174	10,440
Hay	168 tons	168	2,360
Lath	5,113,450 pieces	1,278	6,000
Logs	200,348,681 feet b. m.	400,697	1,982,083
Lumber	104,674,000 feet b. m.	157,011	1,358,145
Machinery	6 tons	6	1,800
Meats	18 tons	18	7,200
Miscellaneous merchandise	597 tons	597	89,550
Oysters and clams	4,240 sacks	212	28,475
Shingles	39,090,000 pieces	3,909	79,180
Sugar	18 tons	18	2,700
Veneer basket stock	15,060 bundles	270	5,200
Total		567,510	3,713,171

APPROPRIATIONS.

Previous project (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 579)	$259,482.00
Present project: July 27, 1916	100,000.00
Total of appropriations	359,482.00

Received from sales, $68.10.

2. GRAYS HARBOR AND BAR ENTRANCE, WASH. (A2).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations during the year. The sum of $2,182.34 was expended for inspections and care of plant, and charged to maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Classes.	American.	Net registered tonnage.
Registered:		
Steamers	343	319,788
Sailing	35	35,602
Total	378	355,390

Freight traffic.

Articles.	Amount.	Short tons.	Value.
COASTWISE IMPORTS.			
Asphalt		715	$8,875
Butter		113	101,700
Eggs	9,100 cases	182	109,200
Fire brick		126	1,512
Fire clay		20	160
Fruit and vegetables		2,759	165,540
Hay		56	1,120
Hardwoods		377	7,540
Iron and steel		255	26,775
Machinery		120	36,000
Miscellaneous merchandise		8,754	1,313,100
Oil, refined	6,465 barrels	1,099	64,465
Salt		135	2,970
Sugar		1,220	183,000
Total		15,931	2,037,888
COASTWISE EXPORTS.			
Fish, canned	1,144 cases	40	6,864
Lumber	260,070,163 feet b. m	390,105	3,474,408
Total		390,145	3,481,272
FOREIGN EXPORTS.			
Lumber	33,253,837 feet b. m	49,881	431,471

APPROPRIATIONS.

UNITED STATES FUNDS.

June 3, 1896	$20,000.00
June 4, 1897	350,000.00
Mar. 3, 1899	285,000.00
June 6, 1900	50,000.00
Mar. 3, 1901	138,225.00
June 28, 1902	156,775.00
Mar. 3, 1905	30,000.00
Mar. 2, 1907	200,000.00
May 27, 1908	300,000.00
Mar. 3, 1909 (allotment)	100,000.00
June 25, 1910	75,000.00
Feb. 27, 1911	300,000.00
Aug. 24, 1912	655,000.00
Oct. 2, 1914	110,000.00
Mar. 4, 1915	460,000.00
Aug. 8, 1917	92,500.00
Total appropriations	3,322,500.00

CONTRIBUTED FUNDS.

Dec. 7, 1915		$15,000.00	
Nov. 2, 1916		10,000.00	
		25,000.00	
Sept. 5, 1916, returned	$933.05		
Sept. 17, 1917, returned	1,177.50		
		2,110.55	
Net total of contributed funds			22,889.45
Grand total			3,345,389.45

Receipts from sales, etc., $6,571.66.

3. GRAYS HARBOR (INNER PORTION) BETWEEN ABERDEEN AND THE ENTRANCE TO SAID HARBOR AND CHEHALIS RIVER, WASH. (A3).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations except inspections and repair of dredge *Oregon*. The dredge was leased to the Eureka Cedar Lumber & Shingle Co. on June 11, 1917, for private dredging, which was completed July 26, 1917. The dredge was returned to the Portland district September 21, 1917. The sum of $3,986.91 was expended for maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Logs	360,000,000 feet b. m	720,000	$4,320,000
Sand and gravel	34,320 cubic yards	51,480	34,320
Total		771,480	4,354,320

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 459)		$174,000
Present project:		
Mar. 2, 1907	$177,000	
Mar. 3, 1909 (allotment Apr. 23, 1909)	25,000	
Mar. 3, 1909 (allotment Nov. 20, 1912)	20,000	
June 25, 1910	32,500	
Feb. 27, 1911 (Chehalis River)	10,000	
Mar. 4, 1913	30,000	
Oct. 2, 1914	15,000	
July 27, 1916	30,000	
		339,500
Total of appropriations		513,500

Received from sales, $2,330.05.

4. HOQUIAM RIVER, WASH. (A4).

OPERATIONS DURING THE FISCAL YEAR.

No work was done during the year and no money was expended.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

The commercial statistics are combined with those for Grays Harbor, inner portion, and Chehalis River, Wash.

APPROPRIATION.

July 25 1912	$12,000

PUGET SOUND AND ITS TRIBUTARY WATERS, OLYMPIA, TACOMA, AND BELLINGHAM HARBORS, LAKE WASHINGTON SHIP CANAL, SNOHOMISH AND SKAGIT RIVERS, SWINOMISH SLOUGH, WATERWAY CONNECTING PORT TOWNSEND BAY AND OAK BAY, COLUMBIA RIVER BETWEEN WENATCHEE AND KETTLE FALLS, WASH. (GROUP B).

5. PUGET SOUND AND ITS TRIBUTARY WATERS, WASH. (B1).

The snag boat *Swinomish* was operated continuously during the year in Skagit, Snohomish, Stilaguamish, and Puyallup Rivers, Lake Washington Canal, Lake Washington, Lake Union, West Waterway, East Waterway, Swinomish Slough, and Port Townsend-Oak Bay Canal. The work consisted of removing snags, cutting overhanging trees, dredging at bars, and bank-protection work. The boat also assisted in towing scows, hoisting machinery, handling guns, raising sunken vessels, and inspection trips. During the year 3,107 snags, aggregating 52,752 linear feet, were removed and 9,336 cubic yards of material dredged. Unit costs are not available. The total expenditure during the year was $22,712.75, all of which was for maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

STILLAGUAMISH RIVER.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Agricultural implements		42	$8,820
Eggs	3,000 cases	60	36,000
Flour, feed, and grain	45,500 sacks	1,820	91,000
Fruit and vegetables		761	45,660
Hay		341	6,820
Hides		71	32,660
Live stock	102 head		10,200
Logs	13,018,130 feet b. m.	26,036	146,216
Lumber	1,650,000 feet b. m.	2,475	29,700
Machinery		72	21,600
Milk, condensed	32,836 cases	1,100	188,807
Miscellaneous merchandise		2,320	348,000
Piling and poles	13,810 linear feet	242	1,243
Total		35,340	1,014,486

DUWAMISH WATERWAY.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Brick	[illegible] pieces	13,706	$43,856
Coal		457	1,568
Lumber	[illegible] feet b. m.	7,845	125,520
Machinery		110	19,000
Oil, fuel and refined	[illegible] barrels	4,745	50,132
Piling and poles	[illegible] linear feet	86,273	394,329
Steel tanks		100	25,000
Total		113,235	659,705

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 532)		$69,500
Present project:		
July 13, 1892	$15,000	
Aug. 18, 1894	14,000	
June 3, 1896	75,000	
Mar. 3, 1899	20,000	
June 13, 1902	35,000	
Apr. 28, 1904 (allotment)	12,000	
Mar. 3, 1905	20,000	
Mar. 3, 1905 (allotment)	4,500	
Mar. 2, 1907	75,000	
Mar. 3, 1909 (allotment)	25,000	
June 25, 1910	100,000	
Feb. 27, 1911	20,000	
July 25, 1912	25,000	
Mar. 4, 1913	25,000	
Aug. 8, 1917	25,000	
July 18, 1918	10,000	
		500,500
Total of appropriations		570,000

Received from sales, $5,436.93.

WATERWAY CONNECTING PORT TOWNSEND BAY AND OAK BAY, WASH. (B2.)

OPERATIONS DURING THE FISCAL YEAR.

There were no operations except inspections. The sum of $663.50 [illegible] for maintenance. Shoaling has reduced the controlling [illegible] feet at mean lower low water, and the bulkhead for [illegible] dredged material has settled throughout most of its [illegible] at high tide the swell from passing boats washes over [illegible] carries the dredged material in the fill back into the [illegible] While the present condition is not serious and the amount [illegible] washed is not large, the brush bulkhead should be raised [illegible] ge can occur.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Brick	12,000 pieces	30	$120
Butter		50	45,000
Coal		8,117	37,266
Eggs	150 cases	3	1,800
Fish		310	31,000
Flour, feed, and grain	54,525 sacks	2,181	109,050
Fruit and vegetables	2,856 cases	102	6,120
Hay		675	13,500
Hides		12	3,600
Iron		2,725	96,000
Live stock	300 head	75	15,000
Lime rock		5,007	8,000
Lumber	1,250 feet b. m.	2	22
Logs	40,624,482 feet b. m.	81,248	487,494
Machinery		53	15,900
Meats		198	79,200
Mill cinder		2,288	11,560
Miscellaneous merchandise		2,731	409,650
Piling and poles	30.000 linear feet	525	2,700
Sugar	1,520 sacks	76	11,400
Total		106,408	1,384,382

Three steamers of 140, 266, and 350 tons, respectively, made regular trips through the canal during the year. The canal is extensively used by vessels of all descriptions. Complete commercial statistics are not obtainable except by appointment of custodian at the canal for collection.

APPROPRIATIONS.

Mar. 4, 1913	$62,500
Mar. 4, 1915 (allotment Apr. 2, 1915)	15,000
Aug. 8, 1917 (allotment Oct. 6, 1917)	5,000
Mar. 4, 1915 (allotment May 1, 1918)	2,400
Total	84,900

7. OLYMPIA HARBOR, WASH. (B3).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations. The sum of $379.14 was expended for maintenance.

CONTRACTS IN FORCE.

None.

DUWAMISH WATERWAY.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Brick	5,482,275 pieces	13,705	$43,856
Coal		457	1,868
Lumber	5,230,000 feet b. m.	7,845	125,520
Machinery		110	19,000
Oil, fuel and refined	28,243 barrels	4,745	50,132
Piling and poles	4,929,900 linear feet	86,273	394,829
Steel tanks		100	25,000
Total		113,235	659,705

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 532)		$69,500
Present project:		
July 13, 1892	$15,000	
Aug. 18, 1894	14,000	
June 3, 1896	75,000	
Mar. 3, 1899	20,000	
June 13, 1902	35,000	
Apr. 28, 1904 (allotment)	12,000	
Mar. 3, 1905	20,000	
Mar. 3, 1905 (allotment)	4,500	
Mar. 2, 1907	75,000	
Mar. 3, 1909 (allotment)	25,000	
June 25, 1910	100,000	
Feb. 27, 1911	20,000	
July 25, 1912	25,000	
Mar. 4, 1913	25,000	
Aug. 8, 1917	25,000	
July 18, 1918	10,000	
		500,500
Total of appropriations		570,000

Received from sales, $5,436.93.

6. WATERWAY CONNECTING PORT TOWNSEND BAY AND OAK BAY, WASH. (B2.)

OPERATIONS DURING THE FISCAL YEAR.

There were no operations except inspections. The sum of $663.50 was expended for maintenance. Shoaling has reduced the controlling depth to 11 feet at mean lower low water, and the bulkhead for retention of dredged material has settled throughout most of its length so that at high tide the swell from passing boats washes over the top and carries the dredged material in the fill back into the channel. While the present condition is not serious and the amount of material washed is not large, the brush bulkhead should be raised before serious damage can occur.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Brick	12,000 pieces	30	$120
Butter		50	45,000
Coal		8,117	37,266
Eggs	150 cases	3	1,800
Fish		310	31,000
Flour, feed, and grain	54,525 sacks	2,181	109,050
Fruit and vegetables	2,856 cases	102	6,120
Hay		675	13,500
Hides		12	3,600
Iron		2,725	96,000
Live stock	300 head	75	15,000
Lime rock		5,007	8,000
Lumber	1,250 feet b. m.	2	22
Logs	40,624,482 feet b. m	81,248	487,494
Machinery		53	15,900
Meats		198	79,200
Mill cinder		2,288	11,560
Miscellaneous merchandise		2,731	409,650
Piling and poles	30.000 linear feet	525	2,700
Sugar	1,520 sacks	76	11,400
Total		106,408	1,384,382

Three steamers of 140, 266, and 350 tons, respectively, made regular trips through the canal during the year. The canal is extensively used by vessels of all descriptions. Complete commercial statistics are not obtainable except by appointment of custodian at the canal for collection.

APPROPRIATIONS.

Mar. 4, 1913	$62,500
Mar. 4, 1915 (allotment Apr. 2, 1915)	15,000
Aug. 8, 1917 (allotment Oct. 6, 1917)	5,000
Mar. 4, 1915 (allotment May 1, 1918)	2,400
Total	84,900

7. OLYMPIA HARBOR, WASH. (B3).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations. The sum of $379.14 was expended for maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Agricultural implements		42	$8,820
Asphalt		7	84
Box shooks	2,222 pieces	20	244
Brick	6,400 pieces	16	54
Butter		36	32,400
Cement	363 barrels	69	828
Coal		2,028	10,140
Eggs	6,000 cases	120	72,000
Fish		171	25,650
Flour, feed, and grain	65,000 sacks	2,600	130,000
Fruit and vegetables		612	36,720
Greases		9	3,600
Gypsum		11	132
Grain bags and gunnies		37	2,720
Hay		200	4,000
Hides		64	2,500
Iron (scrap and pig)		1,470	58,800
Lime		780	7,800
Lath	40,000 pieces	10	60
Live stock	528 head	132	26,400
Logs	107.215.218 feet b. m	214,430	1,182,643
Lumber	2,506,062 feet b. m	3,759	51,120
Lubricating oil	683 barrels	145	17,075
Machinery		1,662	498,600
Marble		8	320
Meats		293	117,200
Miscellaneous merchandise		6,387	958,050
Oil:			
Fuel	25,962 barrels	4,327	25,962
Refined	9,397 barrels, drums, and cases.	1,605	93,972
Oysters and clams	40,744 sacks	2,037	244,464
Paper		1,250	218,750
Plaster		337	4,044
Sand and gravel	25,015 cubic yards	37,523	18,761
Shingles	4,800,000 pieces	480	8,000
Shells (oyster)		120	1,200
Sugar		660	99,000
Tea		15	15,000
Total		283,472	3,977,113

APPROPRIATIONS.

July 13, 1892	$35,000.00
Aug. 18, 1894	40,000.00
June 3, 1896	32,000.00
Mar. 3, 1899	15,000.00
June 13, 1902	25,000.00
June 25, 1910	$15,000.00
Feb. 27, 1911	43,000.00
Total of appropriations	205,000.00

Receipts from sales, $0.30.

8. TACOMA HARBOR, WASH. (B4).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations. The sum of $1,175.95 was expended for maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Short tons.	Value.
EXPORTS.		
Acetanalid	1	$1,426
Acetate lime	114	14,497
Alfalfa seed	1	250
Aluminum	380	464,968
Ammonia	54	23,922
Apples	692	38,883
Arsenic	198	33,030
Asphalt	27	1,220
Auto parts	84	52,050
Autos (957)	1,414	899,776
Balsam copaiba	4	14,481
Benzol	36	920
Bones	639	92,115
Boots and shoes	330	322,878
Box shooks	11,231	217,324
Brick, fire	1,650	74,260
Bromide soda	56	36,407
Bronze, powdered	15	3,515
Butter	2	1,328
Candles	29	5,700
Canned goods	284	97,312
Carbolic acid	273	216,638
Carbolic chloride	19	4,879
Carbon, black	200	62,868
Caustic soda	4,991	474,720
Cedar poles	1,746	8,883
Cement	61	950
Celluloid	2	2,404
Cereals	732	45,250
Chloride hydrate	1	400
Chloroform	9	7,923
Cigarettes (1,794,625,000)	7,284	3,164,755
Cigars	....	300
Clay (fire)	174	2,852
Clocks	2	1,026
Coal	90,183	452,495
Cocaine	....	18,000
Coffee	136	32,967
Coke	20,920	116,491
Confectionery	60	20,287
Copper	6,485	4,015,722
Corn sirup	360	39,302
Cornstarch	30	3,466
Cotton	28,961	13,376,097
Cotton goods	6,516	3,900,248
Creosote	50	2,140
Crystals	24	13,000
Disinfectant	17	3,156
Dredger spuds	33	602
Drugs and chemicals	85	85,955
Dry goods	578	150,854
Dyes	141	139,919
Explosives	4,956	1,886,366
Flour, 1,089,075 barrels	107,037	11,331,868
Feed	17,519	638,807
Fresh meat	24	10,598
Fish, fresh	500	78,135
Fish, cured	5,039	296,742
Furniture	104	42,196
Flannels	25	15,041
Fertilizer	41	615
Formaldehyde	222	48,942
Glycerine	51	50,000
Graphite	1	186
Gunnies	51	5,859
Glue	21	10,614
Gin	17	4,000
Gum	1	902
Glass	1,034	181,610
Gold coin United States	61	28,711,470
Grinding pebbles	37	1,080
Hardware	2,061	458,606
Hay	7,026	190,717
Hematine crystals	84	60,139
Iron and steel	119,732	12,657,504
Kaolin	100	4,000
K. D. life boats	275	68,875

Freight traffic—Continued.

Articles.	Short tons.	Value.
EXPORTS—continued.		
Lumber, 123,938,016 feet	202,100	$2,265,141
Leather	155	239,203
Lamp chimneys	7	1,046
Linseed oil	23	4,850
Lantern	26	7,808
Liquid cement	9	4,960
Logwood	2	1,640
Logwood extract	11	5,264
Liquid gold		11,603
Milk	5,989	1,374,286
Malt	240	20,414
Malt extract	8	6,000
Marble	2,079	41,693
Manganese	135	19,257
Musical instruments		248
Machinery	11,726	3,974,674
Electric	1,074	499,895
Sewing	11,058	1,013,981
Farm	1,935	336,454
Motorcycles	18	16,150
Muriatic acid	20	2,302
Miscellaneous, general merchandise	76,416	14,785,030
Nitrates	1,930	115,800
Nickel	6	6,000
Napthol	2	2,201
Oats	2,328	198,614
Organs	4	1,276
Oleomargarine	8	3,487
Olive oil	9	6,348
Oils:		
Wood	300	72,060
Transel	26	7,640
Lubricating	855	96,322
Fuel	3,024	32,454
Paints	378	103,694
Pencil slats	287	25,941
Peroxide sodium		285
Prunes	73	12,575
Packing house products	372	137,405
Plaster	121	1,391
Paper	3,563	405,997
Pulp	7,555	627,892
Potatoes	666	35,390
Phenol	160	151,206
Potash	49	47,580
Phosphorus	10	4,223
Perfumery	9	6,088
Peanuts	40	6,000
Paramine	4	17,200
Piles:		
Creosoted	306	28,822
Bark	316	2,160
Provisions	66	23,696
Prussiate soda	4	2,569
Plaster	95	1,023
Pianos	133	55,597
Rosin	251	11,236
Rubber goods	27	22,756
Rice	758	38,550
Root	4	6,900
Rum	30	4,767
Salicylic acid	8	16,172
Sand	10	76
Spars	85	5,820
Ship knees	8	108
Senega root	2	2,959
Shingles	25	298
Bolts	100	3,000
Sulphate soda	7	429
Stearine	33	7,616
Silica	26	522
Sulphur	78	4,680
Soap	2,501	301,256
Soda ash	9,757	601,615
Starch	311	30,052
Stearine acid	20	6,816
Sulphuric acid	12	600
Staves and heads	3,009	116,077
Salmon, canned	1,431	244,838
Tetrachloride	113	25,488
Tin plate	9,838	1,616,192
Twine	819	156,360

Freight traffic—Continued.

Articles.	Short tons.	Value.
EXPORTS—continued.		
Tea	28	$4,200
Titanium	4	1,091
Tobacco	1,285	704,987
Tanglefoot	20	4,553
Tar	82	5,559
Typewriters	29	45,747
Wheat	59,505	4,776,866
Wax	1,808	203,329
Whisky	67	12,289
Zinc	523	213,820
Total	881,723	121,664,212
IMPORTS.		
Antimony	2,325	1,551,864
Antimony ware	25	12,585
Agar agar	26	174,625
Albumen	326	305,260
Arsenic acid	3	500
Barley	1,655	86,922
Bicarbonate of potash	16	12,885
Bricks	5,723	12,046
Bristles	179	154,113
Buttons	164	169,369
Bronze powder	20	26,000
Bean cake	78	3,120
Bulbs, plants, etc	432	38,756
Basket ware	4,170	122,177
Braids, straw	2,759	1,278,787
Braids, hemp	331	347,923
Braids, chip	1,210	138,016
Bamboo	2,130	111,438
Beans	2,629	390,149
Brushes	1,484	756,809
Buckwheat	30	1,250
Beads	67	49,153
Box shooks	220	3,300
Bronze ware	21	5,234
Burgois acid	1	10,000
Brooms	15	600
Brush (Todds)	29,793	77,436
Cereals	532	33,000
Chillies	867	554,875
Cassia	1,800	602,875
Creosote	53	1,600
Catgut	36	2,700
Cyanide soda	27	39,250
Camphor	350	387,044
Cement	160	2,000
Cocoanut, desiccated	358	80,729
Coal (British Columbia)	7,308	36,316
Copper	879	592,402
Cigars, Manila	314	209,651
Cyrus leaves	36	815
Copra	2,860	164,320
Cotton seed	105	20,250
Casings	35	20,850
Combs	1	650
Cotton goods	2,525	1,041,017
Can goods	499	149,596
Cuffs, straw	22	900
Confectionery		150
Camomile flowers	39	39,000
Clocks		1,000
Cotton waste	28	8,250
Chlorate of potash	104	58,196
Coffee	75	18,750
Cattle	10	15,000
Drugs and chemicals	46	33,385
Dyes	1	6,000
Dry goods	45	18,432
Explosives	3,664	1,653,475
Egg yolk	769	569,926
Eggs, fresh	53	4,500
Egg white, frozen	250	250,000
Electrical material	4	1,250
Fans, paper	358	59,482
Feathers	234	186,350
Fire crax	2,519	407,825
Fish nets	5	10,500
Fullers' earth	25	588

Freight traffic—Continued.

Articles.	Short tons.	Value.
IMPORTS—continued.		
Fish:		
Fresh	6,408	$977,663
Cured	2,371	135,004
Furniture	1,540	94,522
Fiber	271	31,819
Feed	1,182	49,775
Fire clay	40	800
Fire brick	858	8,368
Flax	47	7,220
Flour	397	41,113
Gold dust	1	300,000
Gunnies	21	1,500
Gallnuts	317	108,500
Ginger	118	16,368
General cargo	78,435	11,267,731
Glassware, etc	557	32,243
Gypsum	11,443	44,832
Granite	10	121
Hemp	45,585	16,257,089
Handles	136	7,874
Hats	98	53,549
Household goods	7	350
Hemp seed	209	19,600
Hair:		
Pony	1	100
Goat	6	750
Waste	33	3,995
Hyoscyamus leaves	4	40,000
Hay	1,129	34,915
Hides:		
Cow	3,040	2,592,300
Goat	4,497	1,694,275
Pony	23	9,463
Sheep	609	283,410
Dogskin	129	77,400
Buffalo	93	45,700
Fox	1	1,000
Sable	....	1,000
Chamois	....	1,000
Antelope	22	13,200
Deer	22	17,600
Marmot	1	600
Weasel	1	3,010
Indigo	5	4,688
Insect powder	5	5,000
Iodine	5	21,500
Imitation gold	7	9,490
Iron and steel, old rails	10	185
Junk	172	5,129
Kaffine	50	3,650
Kaolin	86	3,201
Lime	1,915	21,562
Lanterns	346	5,981
Linseed	912	40,345
Lamp shades	58	2,787
Linen goods	21	12,719
Lime rock	2,452	4,320
Licorice root	587	58,709
Leather	47	33,122
Lumber, fir, 2,224,475 feet	3,562	33,665
Lumber, mahogany, 108,918 feet	227	9,801
Logs, 283,633,307 feet	840,874	3,216,344
Matches	3,341	409,491
Milk	478	65,125
Marble	8,042	156,858
Menthol	93	326,615
Matting, rugs, etc	11,013	1,146,740
Mineral water	45	1,783
Miscellaneous provisions	1,870	339,045
Machinery	216	83,544
Musical instruments	21	3,626
Miscellaneous	47 876	4,055 209,011
Mustard seed	51	15,309
Manganese ore	46	3,450
Nitrates	29,009	1,766,669
Nuts:		
Peanut	3,952	487,190
Walnut	138	31,220
Oranges	14	300
Ores C. O	422,527	32,534,767
Oats	3,135	161,329
Oil drums	209	11,128

Freight traffic.

IMPORTS.

Articles.	Short tons.	Value.
Oils:		
Fish	23	$2,500
Cottonseed	239	76,600
Creosote	671	26,761
Coconut	10,050	3,647,540
Wood	14,836	3,789,968
Fuel	156,567	2,593,489
Bean	140	25,872
Peanut	84	12,350
Rapeseed	....	40
Nut	66	14,622
Castor	60	12,000
Peppermint	4	2,650
Terrilla	12	2,500
Hardened	2	1,100
Citronella	5	7,000
Menthol	2	125
Paper	9,552	855,768
Pulp	10,019	498,454
Potatoes	45	1,800
Peas, dried	416	46,785
Parasols	56	2,880
Pyrethrum flowers	764	811,500
Palm-leaf fans	510	78,774
Polishing sand	20	390
Porcelaine Ew., etc	31,097	999,550
Pearl shells	32	12,526
Potash:		
Nitrate	50	40,126
Prussiate	1	1,000
Piles	2,120	42,400
Phonograph needles	....	200
Pepper	490	153,880
Plumbing crucibles	16	3,300
Pemmican seed	21	1,470
Rubber	16,137	24,469,420
Rice	10,525	1,203,763
Rattan	962	124,542
Rock	2,500	3,600
Rape Seed	68	4,475
Rackets	24	2,350
Rope, manila	57	21,657
Rubber products, gum, gutta, jalatong, gambier, etc	358	269,360
Silks:		
Raw	269	3,025,298
Waste	1,274	1,571,615
Goods	72	124,556
Sand and gravel	121,541	58,192
Slippers	7	530
Sake	170	13,806
Shoyu	108	9,986
Soy	384	21,081
Salt	370	7,200
Sugar	41	6,569
Scapolia root	41	41,000
Senna leaves	40	40,000
Stearine	....	156
Starini seed	9	900
Shingle bolts	100	3,000
Sea grass	34	1,700
Surgical instruments	4	9,848
Sago	132	37,020
Spars	406	15,950
Sulphur	196	11,760
Tea, 361,709 chests	30,375	5,731,329
Tea siftings	981	123,100
Tin slabs	5,979	4,820,009
Toys, curios, etc	15,712	974,544
Toothpicks	4	288
Tapioca	805	148,070
Tallow	137	27,400
Thermos bottles	10	880
Tobacco	809	811,050
Tile	36	2,160
Wool in grease	2,613	1,758,530
Wadded goods	72	32,240
Watch glass	19	54,060
Woodenware	51	2,700
Wax, vegetable	364	57,790
Wine	15	1,500
Wheat	8	560
Waste, jute	30	7,500
Zinc	44	108,600
Total	2,030,807	148,600,200

Vessels, 1917:	
Arrivals (net registered tonnage 4,500,302)	13,027
Departures (net registered tonnage 4,461,852)	13,013
Imports	$148,600,248
Exports	121,644,212
Total	270,244,460

APPROPRIATIONS.

UNITED STATES FUNDS.

City waterway:		
June 13, 1902	$75,000.00	
Mar. 3, 1903	100,000.00	
		$175,000.00
Puyallup waterway:		
Mar. 3, 1905	40,000.00	
June 30, 1906	160,000.00	
Mar. 4, 1909	40,000.00	
		240,000.00
Total of appropriations		415,000.00
Transferred to other works		75,000.00
Net total		340,000.00

CONTRIBUTED FUNDS.

By city of Tacoma	5,000.00
Grand total	345,000.00

Received from sales, 40 cents.

9. LAKE WASHINGTON SHIP CANAL, WASH. (B5).

OPERATIONS DURING THE FISCAL YEAR.

Work on light standards, coal bunker, hoisting device for spillway gates, revetment of canal banks and dredging of channel below the locks was in progress during the year.

Concrete work.—By the use of hired labor and Government plant, six concrete lighting standards were made and installed in position on the dam; completing all concrete work contemplated under the project.

Coal bunker.—A frame coal bunker having a capacity of about 70 tons was completed.

Machinery.—A machine electrically operated for raising and lowering the spillway gates was purchased under competitive bids and has been installed by hired labor.

Revetment of banks.—At several places between Fremont and the head of Salmon Bay, where danger of erosion extending beyond the Government right of way had developed, the banks were protected by a revetment of piles, brush, and earth; the work, except pile driving, being done by hired labor and use of Government plant. Most of the back fill used was excavated from within the channel.

General and miscellaneous.—A number of wooden signs, bearing public notices concerning trespassing on the canal right of way and the speed at which boats may travel in various sectors of the canal, were made and erected. The following Engineer equipment no longer required on this work was packed and shipped to Camp A. A. Humphreys, Va., to be used for instruction purposes:

Two 12-inch centrifugal pumps.
Two 1¼ cubic yards concrete mixers.
One 20-line telephone system complete.
Twenty arc lamps.
One motor (from Fort Worden).

Expenditures from Federal funds during the year were $88,021.47 for new work and $3,716.17 for maintenance, a total of $91,737.64.

The work to be done with funds provided by King County and the State of Washington between the locks and deep water in Lake Washington was completed on July 10, 1917. The expenditure from contributed funds was $8,295.88.

The only work remaining to be done by local interests is the completion of the channel at Fourteenth Avenue NW. and Tenth Avenue NE. (Latona) as soon as the bridges at these points have been removed. The city of Seattle and the Puget Sound Traction, Light & Power Co. have agreed to do this work at their expense for the privilege of maintaining the present bridges until the completion of the new city bridges over the Lake Washington Canal.

CONTRACTS IN FRANCE.

DREDGING BELOW LOCKS.

Contractor: Erickson Construction Co.
Date of contract: October 25, 1916.
Date of approval: September 19, 1916.
Date of commencement: November 23, 1916.
Date of completion: July 24, 1917.
Amount of contract: 575,000 cubic yards.
Unit price: 19.1 cents per cubic yard, place measurement.
Completed to end of June, 1918: 100 per cent.

DREDGING BELOW LOCKS.

Contractor: Puget Sound Bridge & Dredging Co.
Date of contract: March 6. 1918.
Date of approval: March 21, 1918.
Date of commencement: April 4, 1918.
Date fixed for completion: March 21, 1919.
Amount of contract: 350,000 cubic yards.
Unit price: 26.5 cents per cubic yard, place measurement.
Completed to end of June, 1918: 35 per cent.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened, January 1; closed, December 31.

Vessel classification.

Class.	Vessels.	Net registered tonnage.	Passengers.
DEEP-SEA ARRIVALS AND DEPARTURES.			
Arrived	3,254	3,396,276	123,508
Departed	3,249	3,524,946	124,713
Total	6,503	6,921,222	248,221
LOCAL ARRIVALS AND DEPARTURES.			
Arrivals	23,256	6,415,307	1,667,310
Departures	23,256	6,415,307	1,663,905
Total	46,512	12,830,614	3,331,215

Seattle harbor, freight traffic.

Articles.	Amount.	Total imports and exports.	
		Tons.	Value.
Acetate of lime	1,163 cases	84	$10,627
Agar-agar	307 cases	24	20,877
Airplanes	2	2	5,920
Almonds, shelled	506 boxes	7	4,372
Aluminum	6,923 cases	292	323,045
Ammonia	4,416 cylinders	613	230,407
Ammonia, nitrate of	589 barrels	105	16,958
Anchovies	58 cases	2	1,081
Aniline dye	227 barrels and cases	38	34,272
Aniline oil	18 drums	8	8,005
Antimony ore	35,273 cases and sacks	2,623	1,477,308
Apples	162,289 boxes	4,335	234,062
Asphalt	46,242 barrels	14,186	292,554
Autos	1,498	1,974	1,292,768
Auto supplies	10,920 boxes and cases	1,558	853,171
Auto tires	7,766 cases	781	608,650
Baking powder	6,924 cases	94	60,740
Bamboo	10,852 bundles	391	35,661
Barley	35,540 bushels and sacks	1,458	66,691
Barrels, steel	200	18	2,600
Barrel stock	5,441 bundles	695	28,270
Barytes	143 cases	50	2,500
Baskets	10,158 bundles	696	202,924
Beans and peas	911,962 sacks and bushels	30,919	3,658,041
Beer	112.165 cases	5,399	496,415
Beet pulp	23,512 sacks	1,175	19,302
Belting	5 barrels	2	2,427
Beverages	9,096 cases	759	31,280
Blasting caps	900 cases	22	60,600
Boats, knocked-down		20	40.000
Bones	12,524	636	64 704
Boots and shoes	33,104	934	1,842,307
Borax	58 barrels	11	1,793
Box shooks	963,259 bundles	21,997	592,512
Braid	26,963 barrels	2 692	2,603,857
Bran	206,279 sacks	9 255	287,620
Brass	1,256 bars	34	9,532
Brewers' sprouts	15,174 sacks	693	17,866
Brick	3,949 cents	1,252	75,224
Bristles	4,121 cases	432	476,043
Broom corn	86 bales	7	1,788
Bronze powder	218 cases	10	19,923
Brushes	8,386 cases	399	733,680
Buckwheat	81,484	2,376	78,484
Bulbs and plants	26,590 cases	1,356	319,291
Bullion, gold	231,355 packages and ounces	7	4,085.140
Bullion, lead	431 sacks	54	9,436
Burlap	20,754 bales	5,356	527,966
Butter	47,490 cases	1,639	1,164,412
Buttons	3,934 cases	285	486,288
Calcium, bicarbonate	294 cases	18	9,400
Camphor	38,746 cases	2,106	2,456,406
Canned goods	117,518 cases	18,692	1,933,426
Carbolic-acid crystals	1,436 drums	532	645.083
Carbon, black	1,044 cases	99	31,361
Carpets and rugs	13.875 bundles and rolls	1,058	1,510,105
Car trucks	40	160	60,000
Car wheels	3,139	492	40,061
Casings	793 casks	115	210.722
Cassia bark	8,193 bundles	320	70,825
Castor oil	15,768 barrels	705	169,467
Castor seed	19,981 bushels	626	37,815
Cathodes, electro-copper	12,606 cases	611	75,890
Caustic soda	26,032 drums	9,167	1,024,467
Cement	32,595 sacks and barrels	4,072	52,206
Chain	64 pieces	137	16,463
Cheese	8, 828 cases	668	213,810
Chillies	241 cases	43	4,859
Chocolate	17,449 cases	247	97,675
Chronium ore		220	5,500
Cigarettes	13,934 cases	347	1,258,061
Cigars	1,326 cases	63	185,183
Cinnamon	1,130 cases	44	10,442
Clams	59,091 cases	948	247,853
Clams, canned	738 cases	10	2,440
Clam shells		44	10,442
Clothing	31,722 cases	1,926	1,634,738

Seattle harbor, freight traffic—Continued.

Articles.	Amount.	Total imports and exports.	
		Tons.	Value.
Coal		253,103	$1,210,207
Cocaine	10 cases	1	33,800
Coca	214 cases	17	11,700
Coconut	20,000 cases	728	158,206
Coconut, desiccated	9,985 cases	528	129,947
Coconut oil	57,134 barrels and cases	3,388	778,541
Codfish, fresh and salt		3,057	342,172
Coffee	93,160 sacks and bags	5,975	2,273,031
Coin, gold. (See gold coin.)			
Coin and currency	54 cases	4	144,122
Coke	1,000 boxes	9,946	74,833
Concentrates	66,916 bags and sacks	4,533	1,629,251
Confectionery	31,944 cases	1,705	375,273
Copper	166,686 ingots	4,571	1,282,940
Copper ore	2,090 sacks	479	65,798
Copper blisters	47,956 bars	7,958	4,522,199
Copra	63,340 bags and sacks	4,216	460,382
Copra oil	46,350 cases	2,135	385,494
Cordage	46,506 coils	5,797	1,283,357
Cork	400 bales	230	35,850
Corn	96,169 bushels	2,987	123,705
Cotton	44,429 bales	12,048	5,747,181
Raw	132,357 bales	33,768	15,782,049
Goods and cloth	19,867 cases	2,597	3,112,472
Linters	620 bales	155	24,400
Cottonseed oil	10,754 barrels	602	108,655
Cotton waste	2,592 bales	580	56,862
Crabs, canned	10,933 cases	348	119,684
Crockery and glassware	7,494 cases	712	93,625
Cubebs	149 bags	9	7,152
Curios	10,518 cases	298	631,101
Currants	3,046 boxes and cases	120	28,385
Currency, Russian	1 box		50,000
Drugs and chemicals	84,209 cases	6,435	2,236,983
Dry goods	63,270 cases	5,291	2,725,265
Dye	393 cases	19	30,599
Dyestuff	1,534 cases	220	368,080
Eggs, storage	95,048 cases	2,046	968,027
Egg albumin	2,829 cases	232	165,663
Eggs, dried and frozen	165,664 cases	2,866	1,191,000
Electrical supplies	63,465 cases	5,935	1,690,176
Empty containers	110,525	9,881	647,772
Engines and parts		2,535	720,725
Excelsior	2,675 bales	164	5,155
Explosives, miscellaneous	75,810 drums and cases	8,218	2,983,768
Extracts and spices	8,214 cases	232	100,000
Fans	7,438 cases	348	75,154
Feathers	1,459 bales	217	177,936
Feed	95,193 sacks	8,313	325,741
Ferrosilicon	50 barrels	12	1,782
Fertilizer	104,024 sacks and bags	5,891	166,624
Fibers	2,734 bales	599	122,059
Films	1,226 cases	67	293,239
Fire clay	14,644 sacks	1,087	18,687
Fireworks	8,182 cases	172	44,330
Fir, creosote	427,000 feet	748	20,809
Fish:			
Miscellaneous	8,257 barrels	2,808	282,013
Dried	613 bales	36	5,724
Netting	57 bales	6	8,547
Oil	157,256 barrels and cases	6,262	714,472
Flax	912 bales	237	48,245
Flax products	103 cases	7	21,031
Flint pebbles	4,401 bags and sacks	457	7,585
Flour	590,161 barrels	57,951	5,489,495
Flour and feed		6,335	269,645
Flowers, camomile	356 cases	18	18,600
Fruit:			
Dried	367,192 cases	8,867	1,053,744
Fresh	243,497 cases	10,990	767,955
Fuel oil	4,896,099 barrels and drums	1,088,595	6,920,325
Furniture	23,093 cases	2,212	411,711
Furs	2,941 bundles	161	664,307
Furs and skins	303 bales	30	27,458
Furs, raw	528 bales	49	199,953
Fuse	3,294 cases	164	203,106
Gallnuts	503 cases	46	17,481
Gambier	6,881 cases	1,096	239,325

Seattle harbor, freight traffic—Continued.

Articles.	Amount.	Total imports and exports.	
		Tons.	Value.
Gas:			
Carbide	2,083 cylinders	56	$35,050
Miscellaneous	3,277 cylinders	94	50,559
Gasoline	982,746 barrels	250,060	9,592,166
Gasoline and distillate	7,909 barrels and drums	2,180	72,599
Gas, oxygen	11,132 cylinders	417	231,809
Ginseng	38 cases	1	55,009
Glass and crockery ware	75,508 cases	5,327	1,153,342
Glassware	382 cases	65	18,389
Glass products	8,883 cases	267	141,328
Glucose	260 barrels	44	12,699
Glue stock and glue	1,984 cases and sacks	107	5,216
Goatskins	53 barrels	16	22,350
Gold coin	1,595 boxes and cases	133	55,798,828
Gold dust	662,011 ounces	20	11,763,341
Grapefruit	880 cases	42	6,830
Graphite	7,498 casks and barrels	631	82.364
Groceries	493,475 cases	17,307	2,663,037
Gum:			
Copal	35,942 cases	3,426	535,576
Demar	4,475 cases	453	65,349
Gunnies	2,706 bales	738	110,404
Gut	290 cases	10	26,147
Hair	256 bales	30	21,989
Halibut		10,607	2,063,259
Hardware	1,008,092 cases	87,934	12,066,365
Hats	2,633 cases	123	461,370
Hay	40,660 bales	14,750	402,566
Hematine crystals	1,109 cases	109	48,123
Hemp and hemp rope	177,593 bales and coils	25,404	5,014,507
Hemp seed	14,517 sacks	1,294	49,955
Herring, fresh and salt	33,424 boxes and cases	3,815	368,618
Hides	18,800 bundles and barrels	2,296	5,310,771
Herring, kippered and canned	23,542 cases and boxes	518	144,587
Hides, raw	16,141 bundles and barrels	242	144,014
Honey	995 cases	32	5,186
Hops	904 bales	92	28,571
Household goods	18,451 cases	1,950	754,407
Iron-bark	84,000 feet	230	5,655
Iron and steel		1,669	217,526
Iron:			
Pig		9,085	371,295
Ore		82	4,127
Scrap		11,974	421,773
Junk	18,318 cases	5,009	131,486
Jute:			
Bags	29,143 bales	12,172	1,926,581
Cloth	57,904 bales	29,077	5,493,486
Kaolin	43,143 bags	3,807	95,481
Kapok	579 bales	68	6,745
Lard	9,375 tierces	1,871	628,145
Lead	40,592 kegs and pigs	2,047	286,633
Leather	2,865 bundles, barrels, and rolls.	254	181,401
Leather products	6,914 cases	436	3,128,446
Lemons	52,891 cases	2,472	236,495
Licorice root	4,810 barrels	182	240,500
Lime	111,048 barrels	12,838	118,525
Linen goods	608 cases	53	158,493
Linseed	99,974 bags	2,980	230,951
Linseed oil	4,700 cases	234	26,550
Liquid gold	50 cases		29,470
Liquor	37,452 cases and barrels	2,562	1,044,336
Live stock		1,204	257,418
Logs	217,100,000 feet	433,016	1,986,450
Lubricating oil	71,610 barrels	22,192	963,159
Lumber	87,073,000 feet	144,396	1,784,901
Machinery	164,593 cases	34,076	8,191,140
Maize	40,078 bushels and sacks	1,872	53,609
Magnesite	3,481 sacks	454	22,501
Maguey	640 bales	48	12,985
Malt	83,307 sacks	5,434	255,656
Manganese ore	10,786 sacks	605	67,976
Maroons, crude	672 cases	24	2,978
Matches	16,152 cases	286	813,695
Matting	115,089 bundles and rolls	4,608	808,721
Meat	29,465 cases	6,715	2,470,862

Seattle harbor, freight traffic—Continued.

Articles.	Amount.	Total imports and exports.	
		Tons.	Value.
Meats, canned	1,057 cases	38	$18,270
Meat, reindeer		19	6,573
Menthol	1,986 cases	61	192,513
Metal		3,459	410,473
Metal products	2,867 cases	364	227,831
Mica	40 bales	4	3,291
Milk, canned	1,145,765 cases	27,024	6,015,421
Millet seed	3,012 bags	263	10,019
Mirrors	100 cases	10	10,000
Miscellaneous	171,478 cases	513,641	35,686,673
Oil	3,227 cases	131	31,099
Ore	21,608 sacks	1,201	285,199
Molasses		750	6,750
Mustard seed	24,374 bags	2,009	128,843
Miscellaneous seed	178 sacks	9	1,631
Nails	298,759 kegs	17,437	1,592,692
Naphthol	196 cases	12	16,852
Naval supplies		308	25,936
Nickel cubes	425 barrels	116	114,719
Notions	73,133 cases	2,086	844,797
Nuts	31,321 sacks and bags	2,301	606,119
Oakum	540 bales	14	4,721
Oats	815,607 sacks and bushels	21,187	876,900
Oils and grease	79,723 barrels	16,530	685,581
Olives	14 casks	5	474
Olive oil	1,341 cases	66	20,861
Onions	39,963 sacks and bushels	1,336	115,559
Onion seed	35 bags	2	1,314
Oranges	92,118 cases	3,528	192,940
Orange marmalade	100 cases	5	1,246
Ore	22,749 sacks	1,189	59,802
Oysters	366 sacks	18	3,440
Oyster shells	13,073 sacks	849	16,545
Paint	20,696 barrels and cases	6,161	874,418
Paper	136,001 rolls	26,804	1,204,255
Products	7,140 cases	678	236,818
Old	3,136 bundles	755	24,115
Heavy	11,082 cases	1,260	228,467
Printing and wrapping	79,191 rolls	11,059	460,426
Waste	21,254 bales and bundles	2,552	70,704
Roofing	103,835 rolls	5,443	217,440
Paraffine wax	8,786 bags	325	51,233
Parnstraline	36 cases	4	14,148
Peanuts	232,108 sacks and bags	11,668	1,223,544
Peanut oil	193,175 cases	9,643	1,844,194
Pebbles	3,385 sacks	339	3,387
Pepper	1,726 bags	242	42,529
Peppers	18,965 cases	847	355,330
Peppers, canned	120 cases	5	898
Pencil stock	2,168 cases	423	46,728
Perilla oil	1,519 barrels	317	56,285
Phenol	123 drums	39	27,000
Phonographs	49 crates	3	2,025
Pianos	110 crates	39	56,738
Piling	333 M feet	2,605	125,923
Pineapple, canned	179,511 cases	5,867	575,932
Plaster	36,517 sacks	1,815	44,147
Plumbing supplies	66,005 cases and packages	6,941	786,940
Porcelain	21,295 cases	1,798	436,862
Potash, carbonate of	1,447 cases	106	38,097
Potash, chlorate of	2,555 cases	143	112,191
Potash, muriate of	375 bags	29	6,814
Potash, sulphate of	480 cases	48	5,351
Potassium, iodide of	60 cases	3	12,685
Potatoes	183,973 sacks and bushels	5,935	337,579
Potatoes, sweet	1,828 bushels	55	1,107
Potato starch	838 sacks	92	11,320
Pyrethum flowers	2,906 bales	141	245,423
Rags	2,091 bales	228	19,363
Rapeseed	30,773 sacks	2,142	239,606
Rapeseed oil	70,609 cases	5,399	537,243
Rattan	142,262 bundles and bales	7,087	1,181,432
Rattan core	115 bales	8	6,163
Resin	9,708 barrels	2,205	113,207
Rice	744,586 sacks and bags	41,939	3,397,080
Rice straw	656 bales	118	6,385
Rope, manila	205 coils	23	6,012

Seattle harbor, freight traffic—Continued.

Articles.	Amount.	Total imports and exports.	
		Tons.	Value.
Rubber, crude	375,432 cases	30,387	$35,733,948
Rubber goods and products	13,034	681	409,963
Sago flour	32,772 bags	1,932	159,804
Salmon, canned	3,528,221 cases	89,480	23,428,666
Salmon, fresh and salt	180 boxes	5,682	939,527
Salmon eggs	402 cases	17	10,500
Salt	557,615 sacks, bags, and boxes	28,177	535,118
Sand and gravel	192,931 cubic yards	289,343	211,428
Sashes and doors	10,940 cls. and bundles	957	94,207
Sardines	500 cases	10	4,852
Scientific instruments	23 cases	1	1,179
Seeds, miscellaneous	17,221 sacks, bales, and bags	905	182,672
Seed, Lucerne	433 bags	39	6,706
Shellac	75,738 bags	5,904	3,965,582
Shells	1,007 cases	50	18,682
Sheep	2,240 head	56	13,944
Sheepskins	31 bales	4	15,843
Shingles	9,300 bundles	233	5,946
Shoes. (See Boots.)			
Shrimps	544 barrels	38	7,559
Silk goods	10.354 cases	1,052	6,120,617
Silk, raw	146,598 bales	9,950	100,699,498
Silk waste	7,542 bales	767	1,911,636
Silver	200,632 ounces	6	151,477
Silver ore	2,040 sacks	102	8,600
Slate	85 boxes	20	1,300
Soap	95,433 cases	3,393	401,267
Soap grease	1,191 barrels	229	58,969
Soda ash	55,725 sacks	7,663	464,429
Soda, caustic	535 drums	199	18,796
Soda, nitrate of	1,114 bags	113	3,558
Soda, cyanide of	1,230 cases	42	62,780
Soup tablets	143 cases	4	2,484
Soya beans	18,602 sacks	1,339	66,507
Soya-bean oil	3,164,551 cases and barrels	107,723	30,071,156
Spelter	41,751 plates	5,740	1,934,843
Spices	45,792 cases	2,466	700,181
Sponges	36 bales	2	1,600
Starch	310 bags	31	2,390
Stationery	6,629 cases	433	119,467
Stationery supplies	99,214 cases	6,296	1,051,344
Stearin	937 bags	88	24,840
Steel products		582	86,323
Steel rails		11,478	605,624
Stockfish	1,006 bundles, bales, and cases	268	55,567
Stock food	61,758 sacks	2,242	54,360
Structural steel	3,582 pieces	249,783	29,443,063
Sugar	996,375 sacks and bags	52,422	7,054,732
Sugar-beet seed	11,129 sacks	418	121,364
Sulphur	12,345 sacks and bags	860	24,206
Sulphuric acid crystals	4,248 sacks	300	3,753
Sunflower seed	8,457 sacks	526	62,100
Sirup	6,311 cases and barrels	1,365	114,733
Tallow	19,606 cases and tierces	2,152	484,324
Tanning extract	4,100 cases	117	2,923
Tapioca	51,637 bags and sacks	3,283	447,385
Tar	3,224 barrels	894	12,577
Tarred line	88 bales	7	6,882
Tea	433,826 chests, packages, and cases	11,548	4,905,197
Teakwood	315 bags	806	54,538
Tiling	503 boxes	41	4,405
Tin and tin plate	644,338 pigs, packages, and boxes.	35,667	5,566,589
Tin ore, scrap and slab	290,331 sacks and cases	15,147	7,681,171
Tin cans	5,907 cases	331	11,811
Tobacco	114,739 cases and bales	5,964	3,777,560
Tobacco leaf	6,123 cases	322	491,903
Toys	34,132 cases	1,485	835,299
Tungsten ore	648 bales and sacks	72	24,479
Turpentine	495 cases	25	3,125
Twine, binding	73,056 bundles and bales	1,952	460,137
Vegetables	263,819 cases	20,132	1,182,808
Walnuts	22,976 bags and sacks	1,126	166,039
Walnuts, shelled	2,000 cases	50	12,442
Whalebone	64 bundles	5	1,978
Whale oil	23,159 barrels	5,583	401,169
Wheat, Manchuria	8.112 bushels	243	8,798

Seattle harbor, freight traffic—Continued.

Articles.	Amount.	Total imports and exports.	
		Tons.	Value.
Wheat	1,549,349 bushels	44,031	$3,349,319
Wine	3,358 barrels	527	54,953
Window glass	9,537 cases	998	204,254
Wire	545,531 bundles and reels	34,049	4,451,419
Wood oil	19,923 barrels	3,852	747,102
Wood products	75,875 bundles, cases, and crates.	7,755	843,939
Wood pulp	10,554 bales	1,076	31,978
Wool	17,887 bales	2,835	2,497,809
Yeast	2,895 cases	61	51,943
Zinc dust	2,300 cases	147	20,154
Zinc plate	74 cases	19	7,150
Zinc sheets	1,934 casks	526	235,831
Total		4,850,627	599,590,955

For report on traffic through the canal see "Operating and care of Lake Washington Ship Canal."

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 532)		$485,000
Present projects:		
June 25, 1910	$155,000	
Feb. 27, 1911	150,000	
Aug. 24, 1912	500,000	
Mar. 4, 1913	5,000	
June 23, 1913	1,100,000	
Mar. 4, 1913 (allotment of Mar. 30, 1914)	10,000	
Aug. 1, 1914	375,000	
Mar. 3, 1915	17,500	
July 27, 1916	348,000	
Aug. 8, 1917	200,000	
		2,860,500
Total of appropriations		3,345,500

Received from sales, $16,154.45.

10. SNOHOMISH RIVER, WASH. (B6).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations. The sum of $251.42 was expended for maintenance. Shoaling has continued rapidly in the upper end of the harbor basin and in the river channel, which is approximately 75 per cent obliterated.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Lime	2,450 barrels	[1] 245	$2,695
Lime rock		[1] 8,370	14,229
Logs	450,211,539 feet b. m	900,423	4,850,000
Lumber	46,657,691 feet b. m.	69,987	722,930
Machinery		[1] 200	60,000
Oil (fuel)	67,625 barrels	[1] 11,259	67,625
Paper		202	33,222
Shingles	56,215,000 pieces	5,622	112,430
Shingle bolts	113 cords	[1] 170	678
Piling and poles	2,400,000 linear feet	[1] 42,000	216,000
Total		1,038,477	6,079,809

[1] From Everett Harbor, bound up Snohomish River; total 62,244 tons, value at $361,227.

EVERETT HARBOR.

Season of Navigation, year 1917: Opened January 1; closed December 31.

Vessel classification.

Class.	American.	Foreign.	Net registered tonnage.
Registered:			
Steamers	465	1	181,01
Sailing	5		3,8
Unrigged	12		[1]
Total	482	1	184,8

[1] Unknown.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Alum			$15,6
Bark	2,677 sacks	134	1,4
Beans	755 sacks	34	8,1
Beet pulp	400 sacks	20	6
Butter	247 cases	7	6,3
Canned milk	415 cases	13	2,2
Canned salmon	11,118 cases	389	71,6
Canned goods		700	52,4
Clay		297	6,1
Coal		20	1
Chloride of lime	4,402 drums	1,849	92,4
Coffee	400 sacks	30	16,1
Eggs	47 cases	1	
Empty salmon cans		565	89,
Fish (salted)	19 barrels	2	
Fish (fresh)		5,335	736,
Fruit and vegetables		327	19,
Flour, feed, and grain	13,640 sacks	542	27,
Fertilizer		80	3,
Glycerin (raw)	11 drums	7	7,
Hay		5	
Iron (scrap and pig)		266	8,
Lime	5,140 barrels	514	6,
Lime rock		8,370	14,
Logs	240,014,533 feet b. m.	480,029	2,582,
Lumber	89,327,400 feet b. m.	133,990	1,384,

Freight traffic—Continued.

Articles.	Amount.	Short tons.	Value.
Machinery		909	$272,700
Matches	887 cases	27	6,109
Meats		10	4,000
Miscellaneous merchandise		17,891	2,683,650
Oil, fuel and refined	67,913	11,307	82,378
Oysters and clams	100 sacks	5	900
Paper		9,956	1,632,784
Powder	11,040 cases	331	77,280
Piling and poles	2,400,000 linear feet	42,000	216,000
Rice	390 sacks	20	2,340
Salt		348	5,220
Sand and gravel	14,000 cubic yards	21,000	14,000
Sash, doors and windows		95	5,500
Shingles	56,215,000 pieces	5,622	112,430
Shingle bolts	113 cords	170	678
Soda ash		1,142	31,976
Soap	2,647 cases	105	10,588
Sulphur	182 sacks	10	600
Sugar	27,542 sacks	1,771	265,650
Tea		7	6,000
Total		746,252	10,584,934

Sixty-two thousand two hundred and forty-four tons, valued at $361,227, of the above commerce went up the Snohomish River and is included in statistics of Everett Harbor.

APPROPRIATIONS.

EVERETT HARBOR.

Aug. 18, 1894	$10,000.00	
June 3, 1896	20,000.00	
Mar. 3, 1899	50,000.00	
June 6, 1900	135,000.00	
Mar. 3, 1901	90,000.00	
June 28, 1902	117,000.00	
Total of appropriations		$422,000.00
Withdrawn		4,422.23
Net total		417,577.77

SNOHOMISH RIVER.

une 25, 1910	25,000.00	
eb. 27, 1911	75,000.00	
ug. 24, 1912	75,000.00	
une 23, 1913	105,000.00	
Total of appropriations		280,000.00
Total Everett Harbor and Snohomish River		697,577.77

Received from sales, $23.

11. SKAGIT RIVER, WASH. (B7).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations. The sum of $1,690.97 was expended r repairs to the tug *Wilson*, and charged to maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Agricultural implements		191	$40,11
Box shooks	57,831 pieces	521	8,67
Eggs	10,910 cases	218	129,92
Flour, feed, and grain	200,000 sacks	8,000	400,00
Fruit and vegetables		2,420	121,00
Grain bags and gunnies	150 bales	57	18,00
Hay		2,391	47,82
Hides		212	97,52
Live stock	982 head		98,20
Logs	227,677,905 feet b. m	455,356	2,618,29
Machinery		200	60,00
Milk, condensed	573,300 cases	19,110	3,300,00
Miscellaneous merchandise		9,342	1,401,30
Oil, fuel and refined	75,933 barrels, drums, and cases.	12,647	319,19
Piling and poles	23,800 linear feet	416	2,08
Sand and gravel	20,000 cubic yards	30,000	20,00
Shingle bolts	7,200 cords	10,800	43,00
Straw		1,000	8,00
Total		554,797	9,287,91

Two steamers of 402 and 279 tons, respectively, made trips regularly betwee Skagit River and Puget Sound points during the year, carrying 1,437 passengers.

APPROPRIATIONS.

June 25, 1910	$100,00
July 25, 1912	15,00
March 4, 1913	10,00
Total	125,00

Received from sales, $1,120.

12. SWINOMISH SLOUGH, WASH. (B8).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations during the year, and no money w expended.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Agricultural implements		302	$63,420
Bale ties	2,200 bundles	35	6,500
Binding twine		17	7,700
Butter		9	8,100
Cement	520 barrels	99	1,244
Eggs	460 cases	10	5,500
Fish		410	65,190
Flour, feed, and grain	524,585 sacks	26,165	1,308,250
Fruit and vegetables		42	2,520
Grain bags and gunnies	640 bales	274	85,488
Hay		4,605	92,100
Lime	50 barrels	5	50
Logs	2,415,836 feet b. m	4,832	33,824
Lumber	749,295 feet b. m.	1,124	16,500
Oil, gasoline and distillate			6,342
Paper		2	400
Sand and gravel	5,144 cubic yards	7,716	4,372
Seeds, garden and field		20	5,124
Straw		3,553	28,424
Sugar		51	7,650
Miscellaneous merchandise		5,075	761,250
Tea		1	1,000
Total		54,347	2,509,948

APPROPRIATIONS.

July 13, 1892	$25,000.00
Aug. 18, 1894	25,000.00
June 3, 1896	25,000.00
Mar. 3, 1899	20,000.00
June 13, 1902	30,000.00
Mar. 3, 1905	5,000.00
Mar. 2, 1907	75,000.00
Mar. 3, 1909 (allotment)	10,000.00
June 25, 1910	10,000.00
Total of appropriations	225,000.00
Amount returned to surplus fund of Treasury	397.64
Net total	224,602.36

Received from sales, $27.55.

13. BELLINGHAM HARBOR, WASH. (B9).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations. The sum of $141.52 was expended for maintenance. Considerable shoaling has occurred in the inner portion of the waterway.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation, year 1917: Opened January 1; closed December 31.

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Agricultural implements		451	$94,710
Box shooks	2,700,000 pieces	24,300	296,946
Butter		15	13,500
Brick	15,000 pieces	40	150
Cement	53,917 barrels	10,244	107,834
Coal		13,738	61,821
Dairy products		1,587	634,800
Eggs	500 cases	10	6,000
Fish, fresh		1,540	154,000
Fish, canned	778,263 cases	27,239	4,669,597
Flour, feed, and grain	43,310 sacks	1,732	86,600
Fruit and vegetables	6,806 boxes and sacks	242	14,520
Gypsum rock	6,160 sacks	308	1,850
Hay		72	1,440
Lath	673,438 pieces	168	1,008
Lime and lime rock	12,120 barrels	1,212	12,120
Live stock	123 head		1,800
Logs	96,131,213 feet b. m	192,262	1,153,572
Lumber	62,928,850 feet b. m	94,394	1,006,862
Machinery		919	275,700
Meats		330	132,000
Miscellaneous merchandise		8,731	1,309,650
Oil, fuel and refined	195,485 barrels, cases, and drums.	24,733	579,896
Piling and poles	1,100,000 linear feet	19,250	99,000
Piling, creosoted	50,000 linear feet	875	20,056
Plaster	10,000 sacks	500	6,000
Sand and gravel	5,219 cubic yards	7,828	5,219
Shingles	11,537,000	1,154	28,842
Sugar	9,300 sacks	465	69,750
Tea	30 chests	1	1,000
Total		434,340	10,846,243

Five steamers of 329, 573, 226, 350, and 191 tons, respectively, made trips regularly between Bellingham and Puget Sound points during the year.

APPROPRIATIONS.

Previous projects (see H. Doc. No. 1491, 63d Cong., 3d sess., p. 405)		$60,000.00
Present project:		
June 25, 1910	$15,000.00	
Feb. 27, 1911	25,000.00	
Aug. 24, 1912	52,250.00	
Mar. 4, 1913 (emergency allotment Aug. 6, 1918)	6,000.00	
		98,250.00
Total of appropriations		158,250.00

Received from sales, $3.30.

14. COLUMBIA RIVER BETWEEN WENATCHEE AND KETTLE FALLS, WASH. (B10).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations during the year. The sum of $1,870.72 was expended for maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Wenatchee to Bridgeport, Wash.—No boats were operated during the year.
Bridgeport to Kettle Falls, Wash.—Commercial statistics not obtained.

APPROPRIATIONS.

Wenatchee to Bridgeport, Wash.:		
Aug. 18, 1894 (allotment)	$8,005.20	
Mar. 2, 1907	42,000.00	
June 25, 1910	25,000.00	
		$75,005.20
Bridgeport to Kettle Falls, Wash.:		
June 25, 1910	100,000.00	
July 25, 1912	25,000.00	
Mar. 4, 1913	40,000.00	
Oct. 2, 1914 (allotment Oct. 7, 1914)	35,000.00	
Mar. 4, 1915 (allotment Apr. 19, 1916)	10,000.00	
Mar. 4, 1915 (allotment June 3, 1918)	1,000.00	
Mar. 4, 1915 (allotment Nov. 1, 1918)	2,500.00	
		213,500.00
Total appropriations		288,505.20

Receipts from sales, etc., $1,088.75.

15. OPERATING AND CARE OF LAKE WASHINGTON SHIP CANAL, WASH.

OPERATIONS DURING THE FISCAL YEAR.

The locks were operated in three 8-hour shifts throughout the year. Maintenance of machinery, buildings, and grounds was continued. The following painting was done by hired labor: Spillway gates, outside woodwork and iron grilles of operating houses, power house, warehouse, and shops, capstans, life buoys, rowboats, launch, iron railings, cover plates, and the interior of lock master's house. Necessary painting of lock gates and valves was done by a local firm. New work and repairs to machinery and valves were done by hired labor and Government plant as follows: Two roller trains for Stoney gate valves, bushings and pins for gate cable sheaves, safety guard for bandsaw, barge to be used for diving operations, brass furnace. Intercommunicating telephone system, miter forks for intermediate and upper guard gates of large lock, and for the service gates of small lock, lathe, power hammer, and a metal planer were purchased, under competitive bids, and installed by hired labor. Pumping plant was overhauled. Sign boards to indicate the speed at which vessels may pass through the canal were made and installed. Two 13-pile dolphins in Shilshole Bay, which were destroyed, were replaced with 19-pile dolphins.

Navigation through the large lock was delayed 753 hours and 30 minutes, and through the small lock 159 hours and 20 minutes, due to the following causes:

Freight traffic.

Articles.	Amount.	Short tons.	Value.
Boom sticks	127,850 linear feet	2,239	$12,785
Bricks		9,858	49,290
Cement		2,528	26,620
Coal		3,013	15,065
Coke		8,865	39,893
Creosote oil		4,736	21,000
Hay and straw		405	8,100
Logs	222,052,000 feet b. m	444,104	2,664,624
Timber	26,026,000 feet b. m	39,039	416,156
Machinery		172	51,600
Miscellaneous		3,072	460,800
Oats		183	4,575
Oil, fuel	99,086 barrels	16,498	98,988
Oil, lubricating and refined	9,226 barrels	2,299	55,356
Piles	543,063 linear feet	9,504	47,520
Pipe, wood		340	9,000
Salt		400	8,000
Sand and gravel	48,749 cubic yards	73,124	49,724
Sawdust		11,850	4,740
Shingles	13,570,000 pieces	1,357	33,925
Spars	12,015 linear feet	210	2,211
Steel, structural		965	96,500
Tile		8,587	42,935
Wood		6,959	34,795
Total		650,307	4,254,202

LARGE LOCK.

	Hrs.	Mins.
Replacing broken cables and sheaves	29	15
Painting lock gates and general repairs to machinery	338	
Friction slipping on gate engines	2	30
Repairs to worm gear of gate engines	2	
Painting and general repairs to valves	367	20
Preparations for removing lower guard gates, defective rheostat grids	1	40
Preparations for removal of lower guard gates for painting	10	15
Electric power off	2	30
Total	753	30

SMALL LOCK.

Painting gates and general repairs	141	
Replacing broken cables and enlarging grooves in gate engine drums	17	
Electric power off	1	20
Total	159	20

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Season of navigation, year 1917: Opened, January 1; closed, December 31.

Vessel classification.

Fishing	6,280
Freight	197
Launches	5,138
Miscellaneous	353
Passenger	175
Sail	56
Scows	1,950
Tugs	8,243
Total	22,392

Total number of lockages	19,530
Total net registered tonnage	591,310

These statistics cover traffic through locks only. For complete commercial statistics for Seattle Harbor see report on "Lake Washington Ship Canal."

EXPENDITURES.

Summary of expenditures during the fiscal year.

Salaries	$51, 622. 00
Electric current for power and light	5, 343. 80
General supplies, including water, fuel, oil, etc	4, 854. 11
General repairs to structures and machinery, including labor and material	16, 807. 66
Care of buildings and grounds	3, 600. 00
Office supplies, telephone service, rent, etc	1, 650. 00
Installation of intercommunicating telephone system	1, 550. 00
Construction of two 19-pile dolphins	1, 150. 00
New machinery for shop	6, 081. 00
New cables for gates	1, 600. 00
Total	94, 258. 57

List of expenditures since the work was placed under operating and care.

1916	$664. 00
1917	53, 641. 53
1918	94, 258. 57
Total	148, 564. 10

16. POLSON BAY, FLATHEAD LAKE, MONT.

OPERATIONS DURING THE FISCAL YEAR.

There were no operations during the fiscal year. The sum of $103.94 was expended for maintenance. This work has been completed and all funds expended. No further report will be submitted.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

No commercial statistics were obtained.

APPROPRIATIONS.

June 25, 1910	$6, 000
Withdrawn for reallotment elsewhere	1, 250
Net	4, 750

NOME HARBOR AND APOON MOUTH OF YUKON RIVER, ALASKA (GROUP C).

17. APOON MOUTH OF YUKON RIVER, ALASKA (C1).

OPERATIONS DURING THE FISCAL YEAR.

There were no operations. An inspection was made, which showed that no deterioration has taken place in the dredged channel. The funds provided by the river and harbor act of August 8, 1917, are not sufficient for dredging a channel through the bar at the mouth of the river, and on account of war conditions no further work is proposed at this time. The sum of $1,115.14 was expended and charged to maintenance.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Season of navigation: June to October.

FREIGHT TRAFFIC.

There were 179 barge round trips and 50 steamboat round trips during the year 1917. The traffic amounted to 34,315 tons.

APPROPRIATIONS.

July 25, 1912	$130,000
Aug. 8, 1917	45,000
Total	175,000

18. NOME HARBOR, ALASKA (C2).

OPERATIONS DURING THE FISCAL YEAR.

No work was done during the year except preparation of plans and specifications and securing bids. It was found that the work contemplated by the project could not be done with the funds available, and all bids were rejected. No work is proposed at present on account of war conditions. The sum of $623.36 was expended and charged to improvement.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

Detailed statistics were not obtainable. The following information was furnished by telegraph by the Nome Chamber of Commerce:

	Short tons.	Value.
Imports from the United States	14,678	$882,495
Foreign imports	2,300	149,265
Foreign exports	200	8,000
Coastwise shipping	803	160,000
Total	17,981	1,199,760

Passengers arrived from United States	787
Passengers departed for United States	1,343
Local passenger service	704
Total	2,834

Length of season, 135 days.

Delays loading and unloading on account of surf, 50 per cent; the proposed improvement is expected to nearly eliminate these delays.

Paid for lighterage, $75,000. Proposed improvement should reduce 50 per cent.

APPROPRIATIONS.

Aug. 8, 1917	$105,000

IMPROVEMENT OF RIVERS AND HARBORS IN THE HONOLULU, HAWAII, DISTRICT.

REPORT OF LIEUT. COL. R. R. RAYMOND, CORPS OF ENGINEERS.

IMPROVEMENTS.

[The letters and figures in parentheses after the titles indicate the group and the numerical order in the group to which the respective improvements belong for purposes of appropriation.]

	Page.
1. Honolulu Harbor, Hawaii (A1)	3433
2. Kahului Harbor, Hawaii (A2)	3435
3. Hilo Harbor, Hawaii (A3)	3437

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1839 TO 1848.

1. HONOLULU HARBOR, HAWAII (A1).

At the beginning of the fiscal year a contract had been entered into for dredging the area now occupied by the quarantine wharf. No dredging was done, and the contract annulled March 8, 1918. Under a new contract dated October 29, 1917, a portion of the area covered by the annulled contract was dredged and 102,000 cubic yards were removed at a unit price of 65 cents. This contract was practically completed, some cleaning up remaining to be done.

At the beginning of the fiscal year a contract had been entered into for straightening the entrance channel. This work has been completed; 30,992 cubic yards were removed at a cost of 29 cents, and 30,810 cubic yards at $1.49.

CONTRACTS IN FORCE.

Contractor: Hawaiian Dredging Co. (Ltd.)
Character of work: Approximately 100,000 cubic yards.
Price per unit: 65 cents.
Date of approval: November 18, 1917.
Date for beginning work: December 28, 1917.
Date of expiration: June 28, 1918.
Percentage of completion: 99 per cent.

COMMERCIAL STATISTICS.

[Calendar year 1917.]

Freight traffic.

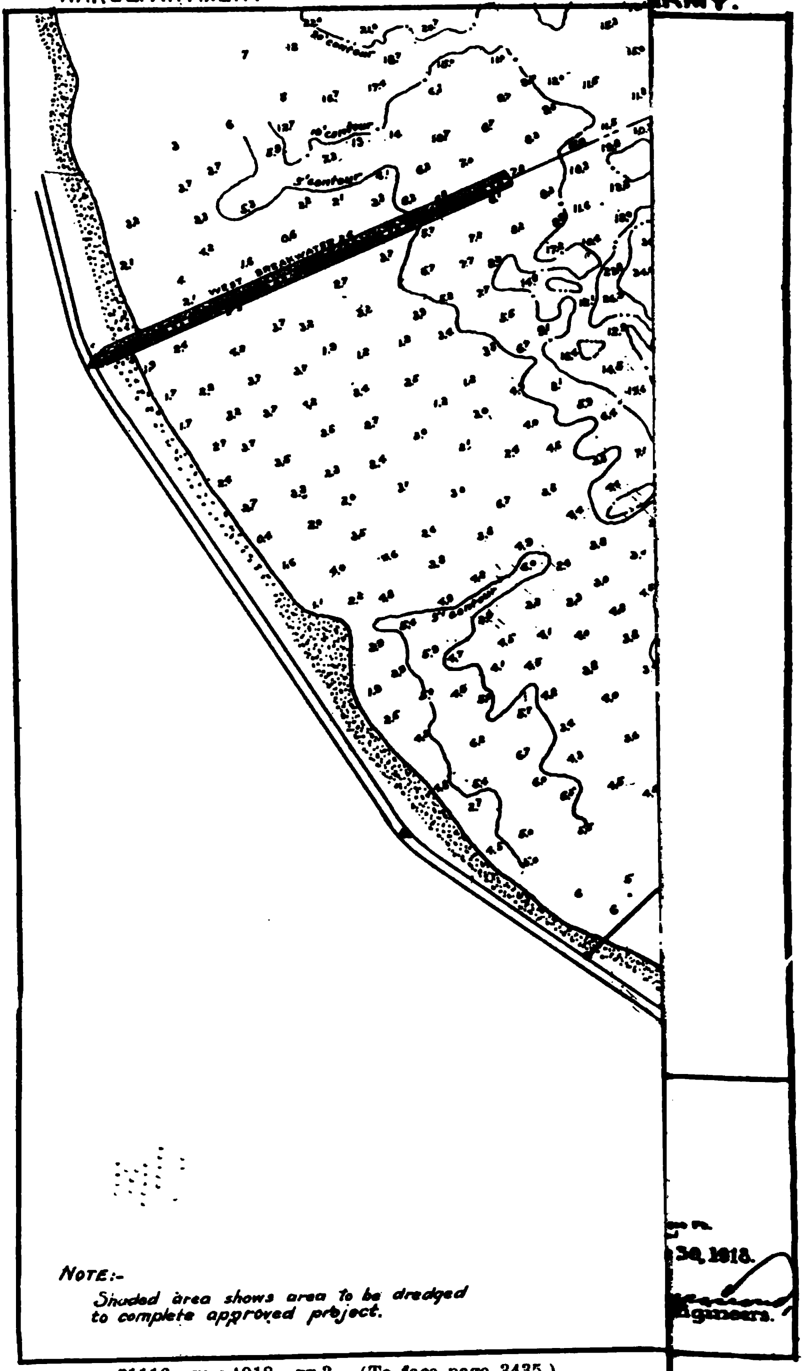
Commodities.	Quantities in tons.	Estimated values.
INWARD, TRANSPACIFIC.		
Building materials, sundry	21,174	$2,646,756
Lumber	76,588	684,811
Logs	626	82,732
Shingles	4,362	119,955
Cement	9,857	739,275
Clothing and wearing apparel	10,230	12,276,000

Freight traffic—Continued.

Commodities.	Quantities in tons.	Estimated values.
INWARD, TRANSPACIFIC—continued.		
Cotton manufactures	$1,512	$1,270,080
Coal, soft	79,793	1,595,860
Drugs and chemicals	1,553	2,329,500
Explosives	364	204,290
Fertilizers	55,842	4,188,150
Fiber bags, gunnies, etc	3,232	727,200
Fish	596	357,600
Flour	11,501	920,800
Fruits, fresh	10,750	271,941
Furniture	7,088	1,063,200
Groceries	49,892	11,714,520
Hay and feed	69,134	4,355,442
Iron and manufactures	42,716	10,251,590
Leather and manufactures	1,157	1,013,532
Live stock, 794 head	132	55,440
Meat and products	5,693	1,949,283
Poultry	99	69,300
Eggs, 4,113 cases	206	61,695
Oil:		
Crude, 48,030,136 gallons	168,100	5,282,604
Gasoline, 10,103,794 gallons	35,363	2,010,651
Kerosene, 2,924,930 gallons	14,625	4,165,736
Lubricating, 1,135,524 gallons	2,510	301,200
Papers, books, and stationery	1,701	680,400
Rice	46,435	3,107,850
Spirits, wines, etc	1,046	143,302
Beer	1,458	72,650
Tobacco and products	2,500	1,226,100
Unclassified	131,964	16,623,655
	1,206,546	92,563,094
OUTWARD, TRANSPACIFIC.		
Building materials, sundry	113	2,525,708
Coal, soft	27,833	558,660
Fertilizer	320	24,000
Fiber bags, gunnies	184	30,150
Fruits, fresh	13,629	344,637
Furniture	2,779	416,850
Groceries	46,361	10,894,835
Hay and feed	6,026	379,638
Hides and skins	142	27,750
Iron manufactures	454	106,690
Live stock, 325 head	51	21,420
Oil:		
Crude, 3,088,766 gallons	1,081	33,943
Gasoline, 140 gallons	1	57
Kerosene, 440 gallons	1	284
Lubricating, 17,420 gallons	110	13,200
Rice	1,081	72,967
Sugar, raw	293,158	31,567,726
Beer	50	2,500
Unclassified	46,900	5,862,500
	440,269	52,883,515
INTER ISLAND.		
Inward:		
Sugar	115,455	15,465,197
General	41,076	5,134,375
Total inward	156,531	20,599,572
Outward: General	234,078	29,259,750
Grand total	390,609	49,859,322
RÉSUMÉ FOR PORT OF HONOLULU.		
Trans-Pacific:		
Inward	1,206,546	92,563,094
Outward	440,269	52,883,515
Inter-island:		
Inward	156,531	20,599,572
Outward	234,078	29,259,750
Grand total	2,037,424	195,305,931

WAR DEPARTMENT

RMY.



NOTE:-

Shaded area shows area to be dredged to complete approved project.

30, 1918.

ngineers.

81116—ENG 1918—PT 3. (To face page 3435.)

Number and tonnage of vessels entering and clearing during year.

Class.	American.	Foreign.	Total.	Net registered tonnage.
Registered:				
Steamers	578	409	987	4,109,041
Sail	237		237	175,042
	815	409	1,224	4,284,083
Inter-island traffic: Steamers	1,467		1,467	730,300
Total	2,282	409	2,691	5,014,383

Passenger traffic.

	Trans-Pacific.	Inter Island.	Total.
Arrivals	24,161	41,472	65,633
Departures	18,651	13,717	32,368
Total	42,812	55,189	98,001

APPROPRIATIONS.

Mar. 3, 1905	$200,000.00
June 30, 1906	200,000.00
Mar. 2, 1907	200,000.00
May 27, 1908	200,000.00
Mar. 3, 1909 (allotted Dec. 16, 1909)	25,000.00
June 25, 1910	150,000.00
Mar. 4, 1913	225,000.00
Oct. 2, 1914 (allotted Nov. 2, 1914)	90,000.00
Mar. 4, 1915 (allotted Apr. 1, 1915)	25,000.00
Mar. 4, 1915 (allotted May 27, 1915)	37,500.00
July 27, 1916	106,800.00
Aug. 8, 1917	50,000.00
Total	1,509,300.00

Receipts, from sales, etc., $29.

2. KAHULUI HARBOR, HAWAII (A2).

During the fiscal year 1,174 feet of the west breakwater was completed under contract; 44,922 tons of rock were placed at a unit cost of $2.10 per short ton in place. A survey of the dredged basin was made.

CONTRACTS IN FORCE.

Name of contractor: Kahului Railroad Co.
Amount of work: 88,000 tons stone.
Character of work: Rubble-mound breakwater.
Unit price: $2.10 per ton for stone in place.
Date of approval: May 26, 1917.
Date of beginning: August 15, 1917.
Date of expiration: June 15, 1919.
Percentage of completion: 51%.

COMMERCIAL STATISTICS.

[Calendar year ending December, 1918.]

Freight traffic.

Commodities.	Quantities in tons.	Estimated value.
INWARD, TRANS-PACIFIC.		
Building material, sundry	2,137	$266,440
Lumber (7,079,353 feet b. m.)	14,159	1,253,071
Logs (275,114 feet b. m.)	510	67,320
Shingles	7,348	202,070
Cement	4,980	373,500
Clothing and wearing apparel	35	42,000
Cotton manufactures	3	250
Coal, soft	178	3,560
Drugs and chemicals	28	41,000
Explosives	81	45,803
Fertilizers	4,909	368,175
Fish	7	4,200
Fiber bags, gunnies, etc	17	3,825
Flour	855	68,400
Fruits, fresh	215	5,631
Furniture	481	62,150
Groceries	2,636	618,460
Hay and feed	6,666	419,958
Iron and manufactures	6,496	1,536,460
Leather and manufactures	12	10,500
Live stock	88	36,960
Meat and products	24	8,217
Poultry	10	7,000
Eggs	90	27,000
Oil, crude, 9,846,284 gallons	34,462	1,082,101
Gasoline, 480,840 gallons	1,563	89,325
Kerosene, 228,210 gallons	1,241	353,431
Lubricating, 140,900 gallons	939	112,680
Papers, books, and stationery	18	7,200
Rice	5	337
Sugar	29	3,886
Spirits, wine, etc	690	87,030
Beer	132	6,500
Tobacco and products	24	11,769
Unclassified	6,613	826,625
	97,681	8,052,825
OUTWARD, TRANS-PACIFIC.		
Fish	1	600
Flour	1	80
Fresh fruit	1	25
Furniture	30	4,500
Groceries	7,329	1,722,315
Hides and skins	55	6,875
Iron manufactures	17	3,995
Oil, lubricating, 650 gallons	4	480
Sugar, raw	96,011	9,337,135
Unclassified	6,548	818,500
	109,997	11,894,505
INTERISLAND.		
Inward	16,179	2,022,375
Outward	4,996	624,500
	21,175	2,646,875
RÉSUMÉ FOR PORT OF KAHULUI.		
Trans-Pacific:		
Inward	97,681	8,052,825
Outward	109,997	11,894,505
Interisland:		
Inward	16,179	2,022,375
Outward	4,996	624,500
	228,853	22,594,206

Number and tonnage of vessels entering and clearing during year.

Class.	American.	Foreign.	Total.	Net registered tonnage.
Registered:				
Steamers	130	2	132	538,034
Sail	26		26	12,950
	156	2	158	550,984
Interisland traffic: Steamers	328		328	196,750
Totals	484	2	486	747,734

Passenger traffic.

	Trans-Pacific.	Inter Island.	Total.
Arrivals	381	3,017	3,398
Departures	279	3,637	3,916
Total	660	6,654	7,314

APPROPRIATIONS.

June 25, 1910	$150,000
Feb. 27, 1911	150,000
July 25, 1912	100,000
Oct. 2, 1914 (allotted Nov. 2, 1914)	10,000
Mar. 4, 1915 (allotted Apr. 2, 1915)	10,000
July 27, 1916	110,000
June 12, 1917	100,000
Aug. 8, 1917	10,000
Total	640,000

Receipts from sales, etc., $1.50.

3. HILO HARBOR, HAWAII (A3).

The breakwater has been completed for 5,390 feet and 60 feet of substructure has been built in advance of the completed portion.

A contract was entered into with the Breakwater Co. on October 16, 1911, for building a rubble-mound superstructure and was annulled April 7, 1914.

A new contract was entered into April 30, 1914, for the completion of the uncompleted portion of the annulled contract. This contract was annulled October 28, 1916, and the work was completed by the American Surety Co. of New York, the surety for the contract. During the fiscal year 37,745 tons of rock were placed, making a total of 188,294 tons placed under this contract.

A contract was entered into April 20, 1918, for building an incomplete section of the breakwater. During the fiscal year 5,207 short tons of stone were placed.

CONTRACT IN FORCE.

Contractor: Hawiian Dredging Co. (Ltd.)
Amount of work: 60,000 short tons.
Character of work: breakwater.
Price per unit: $2.47 per short ton in place.

Date of approval: May 18, 1918.
Date for beginning work: August 4, 1918.
Date of expiration: June 4, 1920.
Percentage of completion: 8 per cent.

COMMERCIAL STATISTICS.

[Calendar year ending December, 1918.]

Freight traffic.

Commodities.	Quantities in tons.	Estimated value.
INWARD, TRANS-PACIFIC.		
Building materials, sundry	2,375	$285,000
Lumber, 3,747,200 feet b. m.	7,494	663,219
Logs	....	....
Shingles	80	2,200
Cement	3,256	244,200
Clothing and wearing apparel	816	979,200
Cotton manufactures	71	5,128
Coal, soft	557	10,140
Drugs and chemicals	267	400,700
Explosives	26	14,638
Fertilizers	4,533	339,975
Fiberbags, gunnies, etc	354	79,670
Fish	22	15,200
Flour	110	8,900
Fruits, fresh	908	22,927
Furniture	1,446	216,900
Groceries	3,788	890,180
Hay and feed	16,573	1,045,039
Hides and skins	150	18,770
Iron and manufactures	4,962	1,166,070
Leather and manufactures	133	116,375
Live stock, 109 head	18	7,780
Meat and products	786	269,126
Poultry	[1] 193	67
Eggs, 36 cases	1	400
Oil:		
Crude, 1,202,114 gallons	4,207	132,091
Gasoline, 1,217, 305, gallons	4,256	243,240
Kerosene, 126,850 gallons	634	180,563
Lubricating, 82,004 gallons	526	63,120
Paper, books and stationery	202	80,400
Rice	1,055	71,212
Sugar	5	670
Spirits, wine, etc	70	9,580
Beer	79	3,970
Tobacco and products	291	242,590
Unclassified	5,191	648,875
	65,242	8,476,695
OUTWARD, TRANS-PACIFIC.		
Lumber, 795 feet b. m.	1	120
Fiber, bags, etc	5	1,125
Fresh fruits	13	328
Groceries	170	39,970
Hides and skins	43	5,375
Iron and manufactures	51	12,985
Rice	45	3,0[illegible]7
Sugar	155,958	18,653,[illegible]
Unclassified	12,579	1,572,375
Total	168,865	20,289,140
INTERISLAND.		
Inward:		
Sugar	73,178	8,102,722
General	22,602	2,815,250
Total inward	95,780	10,917,972
Outward: General	29,641	3,705,225
Grand total	125,421	14,623,197

[1] Pounds.

Freight traffic—Continued.

Commodities.	Quantities in tons.	Estimated value.
RÉSUMÉ FOR PORT OF HILO.		
Trans-Pacific:		
Inward	65,242	$8,476,628
Outward	168,865	20,289,140
Interisland:		
Inward	95,780	10,917,972
Outward	29,641	3,705,225
Total	359,528	43,388,965

Number and tonnage of vessels entering and clearing during year.

Class.	American.	Foreign.	Total.	Net registered tonnage.
Registered:				
Steamers	143	12	155	647,245
Sail	42		42	33,625
	185	12	197	680,870
Interisland traffic: Steamers	785		785	370,343
Total	970	12	982	1,051,213

Passenger traffic.

	Trans-Pacific.	Inter-island.	Total.
Arrivals	1,874	16,439	18,313
Departures	2,476	17,780	20,256
Total	4,350	34,219	38,569

APPROPRIATIONS.

Mar. 2, 1907	$200,000.00
May 27, 1908	100,000.00
Mar. 4, 1909	100,000.00
June 25, 1910	200,000.00
Feb. 27, 1911	250,000.00
July 25, 1912	76,000.00
Aug. 24, 1912	100,000.00
June 23, 1913	150,000.00
Aug. 8, 1917	150,000.00
Total	1,326,000.00

Receipts from sales, etc., $18.25.

IMPROVEMENT OF RIVERS AND HARBORS IN THE PORTO RICO DISTRICT.

REPORT OF BRIG. GEN. WILLIAM T. ROSSELL, UNITED STATES ARMY RETIRED.

IMPROVEMENTS.

	Page.
1. San Juan Harbor, P. R	3441

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1848 TO 1852.

1. SAN JUAN HARBOR, P. R.

OPERATIONS DURING THE FISCAL YEAR.

Subproject for expenditure of funds appropriated by the river and harbor act approved August 8, 1917, was submitted on September 15, and approved November 2, 1917. On November 22, 1917, the governor of Porto Rico approved a bill of the legislature complying with the terms of the river and harbor act of August 8, 1917. This law was amended by a joint resolution at a special session of the legislature of Porto Rico, approved March 9, 1918, this amendment being made to remedy certain defects in the original act and does not change the purpose of the act of November 22, 1917. A survey launch has been purchased and put in commission; plans and specifications for the new work prepared, the work advertised, and proposals opened on June 29, 1918. A hydrographic and topographic survey of the harbor and lands to be reclaimed has been 50 per cent completed. Repairs have been made to the War Department buildings occupied by the Engineer Department and a boathouse built. Minor surveys and investigations in connection with the supervision of the navigable waters of Porto Rico have been made; seven permits for structures in the navigable waters of Porto Rico granted; nine structures previously authorized inspected and reported completed, and work under other permits supervised.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

The only commercial statistics available are compiled by the United States customs district of Porto Rico. They refer to the fiscal year and data for calendar years are not available. The compilation for the fiscal year 1918 is not yet available. The statement of imports and exports is for the entire island, and it is estimated that about 55 per cent of the total is handled in San Juan Harbor. The local shipping in San Juan Harbor is of considerable magnitude and importance, and, although its amount can not be definitely ascertained, it is estimated that there is a freight traffic between Catano, on the south shore of San Juan Bay, and San Juan of 50,000 tons per annum, while 1,800,000 passengers per year are carried on ferries between these two points. There are about 83 small schooners engaged in coastwise trade about the island, and from information obtained from the harbor master at San Juan and various shippers it is estimated that 35,000 tons of merchandise, valued at $2,800,000, passes annually through the port on these vessels. Vessels plying between San Juan Harbor and other harbors on the island of Porto Rico and vessels of the United States and foreign navies are not included in the customs report. If such vessels were included, the aggregate net tonnage of all vessels passing through the entrance of San Juan Harbor would exceed 2,000,000 tons per year. The total number of passengers entering and leaving the port of San Juan during the fiscal year 1917 from and to ports outside of the island of Porto Rico was 21,796.

Freight traffic of Porto Rico for fiscal year 1917.

[Length of navigation season, 12 months.]

Articles.	Short tons.	Value.
INBOUND TRAFFIC.		
Foreign imports:		
Fish, cured and dried	4,270	$854,019
Agricultural goods	10,872	782,823
Oil, mineral and vegetable	784	472,461
Provisions and groceries	3,800	437,590
Chemicals, drugs, and paints	332	182,926
Meat and dairy products	432	157,887
Dry goods and leather goods	194	132,522
Spirits, wines, malt liquors	185	106,444
Wood, manufactured	4,164	100,875
Breadstuffs	330	23,486
Iron and steel, manufactured	92	16,567
Household goods	62	15,268
Tobacco, leaf and manufactured	41	15,030
Wool and woolen goods	4	6,667
All other unclassified articles	2,805	701,400
Total	28,367	4,005,965
Coastwise:		
Breadstuffs	130,573	10,673,491
Dry goods, leather and leather goods	14,210	8,863,922
Agricultural goods	77,730	5,701,273
Meat and dairy products	16,188	4,964,273
Iron and steel manufactures	26,667	4,830,978
Provisions and groceries	24,270	3,025,848
Chemicals, rubber and paint	3,148	2,014,783
Wood manufactured, lumber	63,058	1,792,567
Oil, mineral and vegetable	25,359	1,425,381
Fish, cured and dried	5,304	803,636
Coal	145,889	505,052
Tobacco	1,308	487,255
Household goods	2,644	453,084
Cement	70,268	384,418
Spirits, wines, and malt liquors	1,742	205,651
All other unclassified articles	8,011	2,002,784
Total	616,369	48,134,386
Grand total	644,736	52,140,351
OUTBOUND TRAFFIC.		
Foreign exports:		
Coffee	19,701	5,859,625
Cane products—sugar, molasses, and alcohol	8,218	166,518
Tobacco, leaf and manufactured	99	34,679
Tallow	123	22,865
Leather sole	25	22,369

Freight traffic of Porto Rico for fiscal year 1917—Continued.

Articles.	Short tons.	Value.
OUTBOUND TRAFFIC—continued.		
Foreign exports—Continued.		
Fruit, fresh and preserved	513	$15,028
Hides and skins	17	8,530
Straw and palm goods	1	8,396
Seeds	105	5,183
All others unclassified	6,497	1,624,322
Foreign goods shipped to foreign countries	287	86,037
Total	35,586	7,853,552
Coastwise:		
Cane products—sugar, molasses, and alcohol	601,541	55,365,584
Tobacco, leaf and manufactured	5,955	11,689,033
Fruit, fresh and preserved	79,984	3,444,541
Straw and palm goods	47	569,442
Hides and skins	811	405,447
Seeds, annato	333	106,515
Honey	268	103,388
Cotton, sea-island	91	46,911
Coffee	106	32,456
Tallow	29	5,577
All others unclassified	5,174	1,293,327
Foreign goods shipped to United States	530	53,003
Total	694,869	73,115,224
Grand total	730,455	80,968,776
Grand total exports and imports	1,375,191	133,109,127

Vessel classification.

	Arrived.		Departed.	
	Number.	Estimated tonnage.	Number.	Estimated tonnage.
Coastwise	288	580,000	262	530,000
Foreign	313	340,000	303	330,000
Total	601	920,000	565	860,000

Total entered and cleared 1,780,000 tons.

APPROPRIATIONS.

Mar. 2, 1907	$157,500.00
May 27, 1908	220,000.00
Mar. 4, 1909	300,000.00
June 25, 1910	100,000.00
Mar. 4, 1915	8,000.00
July 27, 1916	10,000.00
Aug. 8, 1917	410,000.00
Total of appropriations	1,205,500.00

Receipts from sales, etc., $2.55.

REPORT OF CALIFORNIA DÉBRIS COMMISSION.

IMPROVEMENTS.

	Page.
1. Regulation of hydraulic mining and preparation of plans	3445
2. Treatment of the Yuba River débris situation—Restraining barriers	3449
3. Control of floods, removal of débris, and improvement of Sacramento River, Cal	3449

FOR DESCRIPTION OF IMPROVEMENTS IN THIS DISTRICT, SEE PAGES 1852 TO 1866.

1. REGULATION OF HYDRAULIC MINING AND PREPARATION OF PLANS.

OPERATIONS DURING THE FISCAL YEAR.

Regulation of hydraulic mining.—Ninety-six inspections of hydraulic mines and débris restraining barriers were made at a total cost of $1,140, or $11.88 per inspection.

Nine applications for permits to mine by the hydraulic process were received, 4 permits were granted, 3 permits were revoked, and 4 permits suspended because of failure to abide by rules of the commission or exhaustion of the débris-restraining capacity at a total cost of $1,972 for handling 23 permits and new applications (not yet granted), or $85.74 each.

Synopsis of applications to mine by the hydraulic process and action taken thereon.

No.	Name of mine.	County.	Name of owner.	Mine drains into a tributary of—	Type of restraining barrier.	Approximate amount of gravel to be worked.	Date of application.	Action on application.
						Cubic yards.		
900	Brandy City	Sierra	E. L. Goldstein Co.	Sacramento River	Reinforced concrete dam proposed.	10,000,000	Mar. 22, 1915	Authorized to build dam May 5, 1915.
913	Imperial Consolidated	Placer	Frank R. Porter	do	Concrete dam proposed	1,000,000	Apr. 17, 1916	Approved Jan. 28, 1916.
916	Liberty Hill	Nevada	William Maguire	do	Log crib and hydraulic fill dam with bedrock spillway proposed.	50,000	Sept. 8, 1916	Authorized to build dam Nov. 6, 1916.
919	Burguet	Madera	Amy H. Burguet	do	None	15,000	Jan. 27, 1917	None authorized; permitted to operate without license, exercising care that material is kept out of main watercourse, Feb. 14, 1917.
920	Cleveland	Sierra	Mammoth Channel Gold Mines of California (Inc.).	do	Dam of cobbles in wire baskets backed by gravel fill.	1,500,000	Feb. 7, 1917	Authorized to build dam Apr. 13, 1917.
921	Red Dog	Nevada	L. F. Gerdets	do	Gravel-fill dam with spillway through solid bedrock.	2,000,000	Mar. 20, 1917	Authorized to build dam Apr. 14, 1917.
922	Joseph	Plumas	E. O. Thomas and P. R. Kelsey.	do	Log-crib dam with bedrock spillway.	775,000	June 18, 1917	Authorized to build dam July 13, 1917.
923	St. Louis	Sierra	Wm. Loftus	do	Concrete dam already built on Slate Creek.	200,000	July 17, 1917	License issued Aug. 13, 1917.
924	Nevada Tunnel	Nevada	You Bet Mining Co.	do	Hydraulic tailings dam	3,000,000	Sept. 8, 1917	Authorized to build dam Oct. 6, 1917; license issued Dec. 27, 1917.
925	Elephant	Amador	Mary I. Crocker and J. W. Preston, jr.	San Joaquin River	Earth and rock fill	7,500	Nov. 6, 1917	Authorized to build dam Mar. 2, 1918.
926	Concordia Fraction and Lone Star.	Plumas	Feather River Gold Mines Co.	Sacramento River	Concrete dam and brush barriers.	3,000,000	Nov. 13, 1917	Pending.
928	Blue Tent	Nevada	Eleanore E. Hoeft	do	Rock and gravel fill with concrete-core wall.	136,000	Dec. 20, 1917	Authorized to build barriers Jan. 29, 1918; license issued Mar. 18, 1918.
929	Pacific Lime & Plaster Co. quarry.	Tuolumne	Pacific Lime & Plaster Co.	San Joaquin River	Rock and earth dam	800	Jan. 18, 1918	Authorized to build dam Mar. 23, 1918.
930	Poverty Hill	Sierra	Wm. Loftus	Sacramento River	Concrete dam already built on Slate Creek.	11,647,200	Mar. 18, 1918	Authorized to repair dam Apr. 12, 1918.
931	Pennsylvania and Wehrle.	do	do	do	do	1,597,860	do	Authorized to repair dam Apr. 12, 1918; license issued Apr. 18, 1918.
932	Brandy City	do	E. L. Goldstein Co.	do	Concrete dam	10,000,000	May 8, 1918	Pending.

Licenses revoked.

No.	Name of mine.	Name of owner.	County.	Mine drains into a tributary of—	Date of revocation.
914	St. Louis	Frank R. Ritchie	Sierra	Sacramento River	Aug. 13, 1917.
915	Birdseye	You Bet Mining Co	Nevada	do	Do.
917	Wehrie	Frank R. Ritchie	Sierra	do	Apr. 8, 1918.

Synopsis of licenses to mine by the hydraulic process in force June 30, 1918.

No.	Name of mine.	Name of owner.	Mine drains into a tributary of—	Type of restraining barrier.	Date of license.
127	Depot Hill	F. J. Joubert	Sacramento River.	Concrete dam	Jan. 5, 1909.
725	Moosehead	E. C. Rigney and L. H. Fixen.	San Joaquin River	do	Restored Feb. 14, 1917; suspended Mar. 2, 1918.
867	Hydraulic King	Gold Mountain Hydrau'ic & Dredging Co.	Sacramento River.	do	Oct. 14, 1911.
896	Omega	South Yuba Mining & Development Co.	do	Cobbles in wire baskets backed by a gravel fill.	Issued Mar. 13, 1914; suspended May 15, 1916: restored May 2, 1917.
905	Horse Valley	Horse Valley Mining Co.	do	Concrete dam	Dec. 1, 1915.
907	President Harrison Group.	Standard Mining Co.	do	Cobbles in wire baskets backed by a gravel fill.	Dec. 14, 1915.
908	Brandy City	E. L. Goldstein Co.	do	Hydraulic fill dam with spillway through solid bedrock.	June 30, 1916.
909	Wicker	Edgar N. Ekel	San Joaquin River	Dam of cobbles and gravel; paved spillway.	May 5, 1916.
910	Ludekens	Ludekens Bros. and Mrs. Oona Ludekens.	do	Earth dike; spillway through solid bedrock.	Dec. 28, 1915.
913	Safe Deposit	Safe Deposit Hydraulic Mining Co.	do	do	Apr. 14, 1917.
923	St. Louis	Wm. Loftus	Sacramento River.	Concrete dam already built on Slate Creek.	Aug. 13, 1917; suspended June 8, 1918.
924	Nevada Tunnel.	You Bet Mining Co.	do	Hydraulic tailings dam.	Dec. 27, 1917; suspended June 5, 1918.
928	Blue Tent	Eleanore E. Hoeft.	do	Rock and gravel fill with concrete core wall.	Mar. 18, 1918.
931	Pennsylvania and Wehrle.	Wm. Loftus	do	Concrete dam already built on Slate Creek.	Apr. 18, 1918; suspended June 8, 1918.

Preparation of plans.—Survey of the Sacramento River from Chico Landing to Red Bluff was continued for a distance of seven river miles, at a total cost of $2,175.50, or $310.79 per mile.

Miscellaneous operations.—The commission kept in touch with the work of gold dredges operating under five permits from the Secretary of War, and took general note of numerous others operating along somewhat similar lines, but whose work is not deemed of sufficient importance to require such permits. Representatives of the commission made 19 inspections of gold dredging plants.

Representatives of the commission made 55 inspections of quartz mines or their débris restraining barriers, and six such barriers were constructed under plans approved by the commission.

The planning and execution of works by local interests, including the State, for reclaiming lands from floods, and the relations of these works to the flood control project adopted for the Sacramento River and to their effect on the capacity of other streams of the Sacramento and San Joaquin River systems, have been given much consideration by the commission. Examination of critical points on the Sacramento and San Joaquin Rivers, for use in maturing plans for improving navigability and for relief from floods, has been made. Administrative work to a certain degree overlaps and has to be conducted with that of improvements No. 2 and No. 3 hereunder, and that of the third San Francisco engineer district.

The total cost of the above and all other miscellaneous operations of the commission was $14,750.56.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

See commercial statistics for Sacramento, Feather, San Joaquin, and Mokelumne Rivers.

APPROPRIATIONS.

Oct. 1, 1888	[1] $10,000.00
Mar. 1, 1893 (California Débris Commission)	15 000.00
June 11, 1896 (sundry civil)	15,000.00
June 4, 1897 (sundry civil)	15,000.00
June 19, 1897 (urgent deficiency) (claims)	[2] 111.70
July 1, 1898 (sundry civil)	15,000.00
June 7, 1898 (urgent deficiency) (claims)	[2] .40
Mar. 3, 1899 (sundry civil)	15,000.00
June 6, 1900 (sundry civil)	15,000.00
Mar. 3, 1901 (urgent deficiency) (claims)	[1] 4.37
Mar. 3, 1901 (sundry civil)	15,000.00
Feb. 14, 1902 (urgent deficiency) (claims)	[1] 1.52
June 28, 1902 (sundry civil)	15,000.00
Mar. 3, 1903 (sundry civil)	15,000.00
Apr. 28, 1904 (sundry civil)	15 000.00
Mar. 3, 1905 (sundry civil)	15,000.00
June 30, 1906 (urgent deficiency)	[3] 5,000.00
June 30, 1906 (sundry civil)	15,000.00
Mar. 4, 1907 (sundry civil)	15,000.00
May 27, 1908 (sundry civil)	15,000.00
Mar. 4, 1909 (sundry civil)	15,000.00
Feb. 25, 1910 (urgent deficiency) (claims)	[2] 6.10
June 25, 1910 (sundry civil)	15,000.00
Mar. 4, 1911 (sundry civil)	15 000.00
Aug. 24, 1912 (sundry civil)	15,000.00
June 23, 1913 (sundry civil)	15,000.00
Aug. 1, 1914 (sundry civil)	15,000.00
Mar. 3, 1915 (sundry civil)	15,000.00
July 1, 1916 (sundry civil)	15,000.00
Apr. 17, 1917 (general deficiency) (claims)	[2] .13
June 12, 1917 (sundry civil)	15,000.00
July 1, 1918 (sundry civil)	15,000.00
Total	375,124.22
Less reversions to Treasury subsequent to 1906	56,122.24
Balance	319,001.98

---

[1] For preliminary examination.
[2] Not disbursed through War Department.
[3] To restore property and records destroyed by fire in Apr., 1906.

2. TREATMENT OF THE YUBA RIVER DÉBRIS SITUATION—RESTRAINING BARRIERS.

OPERATIONS DURING THE FISCAL YEAR.

Survey of river channel.—A portion of the river channel, from Daguerre Point to Marysville, was surveyed to determine the effect of restraining works on the river, and for use in doing future work. The total cost and expenditure was $606.14 for 3.2 river miles, or $189.42 per mile.

Work on north training wall.—Repairs were made to a portion of this training wall, large trees were cut down, squirrel holes filled, willows planted to prevent erosion, and brush revetments made where needed. Work of the above character was done on 800 linear feet of training wall at a total cost and expenditure of $2,829.98, or $3.54 per linear foot.

Additions to training walls and dredging of flood channels.—Under War Department permits two gold-dredging companies are conducting their operations so as to produce stable channels of sufficient capacity for maximum floods, confined by training walls, and extending about 4½ miles upstream from Daguerre Point. About 10 per cent of this work has been completed, free of cost to the United States, which would otherwise have cost over $50,000.

CONTRACTS IN FORCE.

None.

COMMERCIAL STATISTICS.

See report on Sacramento and Feather Rivers.

APPROPRIATIONS.

United States funds:		
June 3, 1896	$250,000.00	
June 13, 1902	150,000.00	
		$400,000.00
State of California:		
Mar. 17, 1897	250,000.00	
Feb. 14, 1901	150,000.00	
		400,000.00
Total		800,000.00

Receipts from sales, etc., $23.614.04.

3. CONTROL OF FLOODS, REMOVAL OF DÉBRIS, AND IMPROVEMENT OF SACRAMENTO RIVER, CAL.

OPERATIONS DURING THE FISCAL YEAR.

Enlargement of the river channel below the mouth of Cache Slough.—The two 20-inch pipe-line hydraulic dredges *Sacramento* and *San Joaquin*, with the necessary auxiliary plant, were operated and maintained from December 5 to the end of the year, before this period being at work for another government department. The *San Joaquin*, starting from a point 600 feet south of the United

States Engineer storehouse at Rio Vista, advanced a distance of 7,350 feet southerly along the west bank of the river, making a cut from 200 feet to 300 feet wide and averaging 260 feet, with a resulting depth at mean lower low water of from 18 feet to 23 feet and averaging 21 feet, the total excavation being 1,950,000 cubic yards. The spoil was deposited behind a retaining levee, on the west bank at the base of the Montezuma Hills. The *Sacramento* was used at two places. At Bakers Point a total excavation of 394,530 cubic yards was made, as part of the work of enlarging the river channel by removal of this point. Cuts were made of average width of 220 feet with resulting average depth of 18.4 feet, the dredge advancing 2,620 feet. The spoil was deposited on Sherman Island and on Horseshoe Island. At Lower Sherman Island a total excavation of 1,350,000 cubic yards was made, as part of the work of enlarging the river channel by removal of the lower end of that island. Cuts were made of average width of 245 feet and average depth of 18.5 feet, the dredge advancing 8,205 feet. The spoil was deposited on Lower Sherman Island. A total of 3,694,530 cubic yards was excavated by both dredges, and the total expenditure was $167,298.93. The total cost, after adding outstanding liabilities of $38,563.35 at the end of the fiscal year, and subtracting a net gain in assets during the year of $86,168.31, obtained after subtracting $12,250 for depreciation, was $119,693.97, giving a unit cost of $0.032 per cubic yard. Included in the net gain in assets is the cost of construction under contract of the dredge tenders *Pit* and *Fall*, respectively 99.5 and 99 per cent complete, and with respective invested values of $20,403.10 and $20,362.75.

Miscellaneous shore and office work in connection with this hydraulic dredging includes construction of a lumber and earth retaining wall 7,000 feet long, from 1 foot to 3 feet wide, and from 1 foot to 3½ feet high, and dam 30 feet long by 36 feet wide by 10 feet high on Lower Sherman Island, to help retain hydraulic-dredge spoils; construction of a lumber spillway at Chase's Cut, 2 miles below Rio Vista, 16 feet long by 20 feet wide by 7.5 feet high; planting of willows on 25,000 feet of new levees; placing of brush revetment on 900 feet of new levees; planting of grass to help retain sand fills from hydraulic dredging on 5.5 acres of spoil area; and furnishing of information and descriptions of 112.19 acres of land to the State for procural as rights of way for dredging and spoil disposal, and also a tabulation of 6,357.1 acres additional, comprising all land needed for project purposes, on the river below Grand Island. Also surveys were made, including cross sections of excavation and estimates of yardage for the 18,175 feet of advance of the two hydraulic dredges; boundaries were located on the ground for 481 acres of rights of way secured for spoil disposal; detailed surveys were made of the spoil-disposal area and vicinity on Lower Sherman Island, and on Sherman Island near Bakers Point; and of the water front area near Rio Vista. The expenditure for all the above work was $50,611.10. Adding outstanding liabilities of $1,395.68, at the end of the fiscal year, the total cost was $52,006.78. The total cost of the hydraulic-dredging work and the miscellaneous shore and office work in connection therewith was $171,700.75 for the 3,694,530 cubic yards, or $0.046 per cubic yard.

Under contract with the Olympian Dredging Co. on an hourly basis of payment, the clamshell dredges *Thor*, *Trojan*, and *Hercules* were used as needed between September 8 and the end of the fiscal year. On the west bank of the river between the United States Engineer storehouse at Rio Vista and a point about 2 miles south of Tolands Landing, with the exception of two short intervals, a channel cut was made in the river and, simultaneously, retaining embankments for hydraulic-dredge spoils were built, or existing embankments reinforced, along the project line. The total advance of the dredges was 42,820 feet, and the total excavation was 1,294,870 cubic yards. At Horseshoe Island, formed by the Horseshoe Bend cut-off, new embankments were built and existing embankments reinforced around a portion of the island. The advance of the dredges on the northwest side of the island was 19,500 feet with an excavation of 481,100 cubic yards, while simultaneously making a channel cut in the river and building or reinforcing retaining embankments. The advance of the dredges on the southwest side was 6,600 feet with an additional embankment of 129,800 cubic yards. At Bakers Point, as part of the work of enlarging the river channel by removal of this point, the channel cut at its base was widened and deepened and simultaneously the retaining embankment on Sherman Island was reinforced. The advance of the dredges was 11,000 feet, and total excavation was 173,300 cubic yards. The total excavation on all the above work was 2,079,070 cubic yards, and the total expenditure under the contract was $72,121.11. Total dredging cost after adding $14,705.12 owed the contractor at the end of the fiscal year was $86,826.23, or $0.042 per cubic yard. Additional overhead expenditure, comprising inspection, necessary shore work, surveys, including cross sections of excavation and estimates of yardage for the 79,920 feet of advance of these dredges, and general superintendence and office expense, was $21,636.33. The additional overhead cost, after adding outstanding liabilities at the end of the fiscal year of $3,442, was $25,078.33. Total cost of dredging and additional overhead was $111,904.56, or $0.054 per cubic yard.

Cut-offs between the Feather River and Colusa.—Clamshell dredging was carried on by the dredges *Ajax* and *Mars* under contract with the Olympian Dredging Co. on an hourly basis of payment between November 5 and the end of the fiscal year. The cut-off at Collins Eddy was completed at the end of February, a channel 1,500 feet long, 200 feet wide, and 4 feet deep at low water resulting. A dam at each end of the old river channel was also built by the dredges. The total excavation of 474,817 cubic yards is about 25 per cent larger than originally estimated, due to construction of the two dams from material outside of the cut-off, and some caving of banks. The cost and expenditure under the contract was $25,517.92, or $0.054 per cubic yard. Additional overhead work included clearing of brush and stumps from the right of way, necessary surveying, brush revetment of the 2 dams and planting of willows, inspection, and general superintendance and office work. The cost and expenditure for this work was $9,581.19, making a total cost and expenditure of $35,099.11, or $0.074 per cubic yard.

The cut-off from Wild Irishman Bend to Kinneys Bend was 65 per cent completed, and excavation of 491,517 cubic yards having been made by steps. Expenditure under the contract was $25,960.06. Total cost after adding $7,146.99 owed the contractor at the end of the fiscal year was $33,107.05, or $0.067 per cubic yard. Additional overhead work included brush clearing, necessary surveying, extensive cutting of timber and blasting of stumps, some blasting of banks, inspection, and general superintendance and office work. Expenditure for this work was $11,010, and the cost, after adding liabilities of $1,143.75 at the end of the fiscal year was $12,153.75. Total cost of dredging and additional overhead work was $45,260.80, or $0.092 per cubic yard.

Construction of by-pass weirs.—Survey work was started at the Fremont Weir site and vicinity on April 23, and was continued, along with considerable brush clearing work, by a party of from 8 men to 17 men, in May and June. Detailed topography was taken on 705 acres of land, and brush was cleared and trees cut on 7.5 acres, with a view to determining the best location for borings to test the foundation for the concrete structure to be erected. This survey has been 75 per cent completed.

Expenditure was $2,662.43, and the cost, after adding outstanding liabilities of $1,097.51 at the end of the fiscal year, was $3,759.94.

Preparation of descriptions for cooperative requirements.—As part of the project requirement that certain river levees should be constructed by local interests to such grade and section and within such time as may be required by the California Débris Commission, information and descriptions were given the State relating to 89.6 miles of levees to be constructed on both banks of the river between Sacramento and the mouth of Cache Slough, and 23.4 miles of levees to be constructed on both banks of Steamboat Slough. Total cost and expenditure for the 113 miles of levees described was $910, or $8.05 per mile.

CONTRACTS IN FORCE.

FUEL OIL.

Name of contractor: Shell Co. of California.
Amount: 60,000 barrels (approximately).
Price per unit: From $1.20 to $1.26, according to point of delivery.
Date of approval: April 10, 1917.
Date of commencement: May 5, 1917.
Date of expiration: April 30, 1918.
Percentage of completion at end of fiscal year: 100 per cent.

ENGINE DISTILLATE.

Name of contractor: Standard Oil Co.
Amount: 30,000 gallons (approximately).
Price per unit: 9 cents to 9½ cents, according to point of delivery.
Date of approval: April 10, 1917.
Date of commencement: May 3, 1917.
Date of expiration: April 30, 1918.
Percentage of completion at end of fiscal year: 100 per cent.

HIRE AND OPERATION OF CLAMSHELL DREDGING PLANT.

Name of contractor: Olympian Dredging Co.
Amount: Indeterminate, $30,000 (approximately).
Price per unit: $8.20 per hour for time consumed in actual work and time held idle less than four hours; $6.15 per hour for towing time or time held idle in excess of four hours.
Date of approval: Not required, emergency contract.

Date of commencement: August 15, 1917.
Date of expiration: August 31, 1918.
Percentage of completion at end of fiscal year: 82 per cent.

CONSTRUCTION OF DREDGE TENDER "PIT."

Name of contractor: Nunes Bros.
Amount: $13,450.
Date of approval: September 4, 1917.
Date of commencement: September 11, 1917.
Date of expiration: April 10, 1917 (extended for reasonable period by E. D. 114357/16).
Percentage of completion at end of fiscal year: 99 per cent.

HIRE AND OPERATION OF CLAMSHELL DREDGING PLANT.

Name of contractor: Olympian Dredging Co.
Amount: Indeterminate, $145,000 (approximately).
Prices per unit: Actual work, or time held idle for periods of less than four hours, per hour, $8, $8, $10, $12; towing, or time held idle for periods in excess of four hours, per hour, $6, $5, $7.50, $9.50.
Date of approval: September 27, 1917.
Date of commencement: November 5, 1917.
Date of expiration: August 31, 1918.
Percentage of completion at end of fiscal year: 82 per cent.

CONSTRUCTION OF DREDGE TENDER "FALL."

Name of contractor: Nunes Bros.
Amount: $13,450.
Date of approval: November 2, 1917.
Date of commencement: November 10, 1917.
Date of expiration: June 7, 1918.
Percentage of completion at end of fiscal year: 100 per cent.

WOODEN PONTONS.

Name of contractor: B. P. Lanteri.
Amount: $14,052.50.
Price per unit: $390.55, $730.85, $788.90.
Date of approval: Not required, emergency contract.
Date of commencement: February 15, 1918.
Date of expiration: June 27, 1918.
Percentage of completion at end of fiscal year: 100 per cent.

ENGINE DISTILLATE.

Name of contractor: Standard Oil Co.
Amount: 60,000 to 150,000 gallons.
Price per unit: 10 cents to 12 cents, according to point of delivery.
Date of approval: April 22, 1918.
Date of commencement: May 1, 1918.
Date of expiration: April 30, 1919.
Percentage of completion at end of fiscal year: 16⅔ per cent.

ENGINE DISTILLATE.

Name of contractor: Union Oil Co. of California.
Amount: 60,000 to 150,000 gallons.
Price per unit: 10 cents to 12 cents, according to point of delivery.
Date of approval: May 11, 1918.
Date of commencement: May 15, 1918.
Date of expiration: April 30, 1919.
Percentage of completion at end of fiscal year: 16⅔ per cent.

LEASE OF OIL BARGE.

Name of contractor: Oakland Launch & Tugboat Co.
Amount: 12 months.

Price per unit: $112.
Date of approval: Emergency contract; approval not required.
Date of commencement: May 1, 1918.
Date of expiration: April 30, 1919.
Percentage of completion at end of fiscal year: 16-2/3 per cent.

LEASE OF A QUARTER BOAT.

Name of contractor: San Francisco Bridge Co.
Amount: 12 months.
Price per unit: $95 per month.
Date of approval: Emergency contract; approval not required.
Date of commencement: April 1, 1918.
Date of expiration: March 30, 1919.
Percentage of completion at end of fiscal year: 25 per cent.

HIRE AND OPERATION OF CLAMSHELL DREDGING PLANT.

Name of contractor: Caledonia Dredging Co.
Amount: $20,000 (approximately).
Price per unit: $7.50 per hour for time consumed in actual work and time held idle less than four hours; $4 per hour for towing time or time held idle in excess of four hours.
Date of approval: May 27, 1918.
Date of commencement: July 1, 1918.
Date of expiration: December 1, 1918.
Percentage of completion at end of fiscal year: Nothing.

COMMERCIAL STATISTICS.

See report on Sacramento River, Cal.

APPROPRIATIONS.

UNITED STATES FUNDS.

Previous projects (acts June 25, 1910, to Mar. 4, 1915, inclusive; see H. Doc. No. 1491, 63d Cong., 3d sess., p. 418)	$600,000.00	
July 27, 1916	75,000.00	
Mar. 4, 1915 (allotted May 10, 1917)	5,000.00	
		$680,000.00
Existing project:		
June 12, 1917 (allotted June 20, 1917)	340,000.00	
July 1, 1918	330,000.00	
		670,000.00
Total of United States funds		1,350,000.00

STATE OF CALIFORNIA FUNDS.

State of California appropriated Mar. 1, 1909, for use with this appropriation, and deposited the amount in the United States Treasury July 1, 1911	400,000.00	
This amount and any further sums contributed were accepted and reappropriated by the cited act of Congress.		
State of California appropriated June 7, 1913	200,000.00	
Of which $60,000 was deposited to the credit of the United States on May 20, 1915, and $140,000 July 9, 1915.		
State of California appropriated in 1915 for use with this appropriation, and deposited the amount in the United States Treasury	80,000.00	
		680,000.00

July 13, 1917	$15,000.00	
Aug. 27, 1917	325,000.00	
Aug. 22, 1918	330,000.00	
		$670,000.00
		1,350,000.00
Grand total		2,700,000.00
Receipts from sales, etc.:		
United States funds		21,958.49
Contributed funds		22,721.33
Total		44,679.82

EXPERIMENTAL TOWBOATS FOR MISSISSIPPI RIVER AND TRIBUTARIES.

FOR ADDITIONAL INFORMATION REGARDING THIS WORK SEE PAGES 1873 TO 1877.

OPERATIONS DURING THE FISCAL YEAR.

The board was reorganized by Special Orders, No. 21, Office Chief of Engineers, dated July 27, 1917, Brig. Gen. W. H. Bixby, United States Army, retired, and Lieut. Col. Clarke S. Smith, Corps of Engineers, being detailed as members, vice Col. C. McD. Townsend and Lieut. Col. Geo. M. Hoffman, Corps of Engineers, relieved as members, and Maj. Wildurr Willing, Corps of Engineers, relieved as recorder and disbursing officer. Col. Smith, member, was relieved by Wm. S. Mitchell, assistant engineer, by Special Order No. 36, Office Chief of Engineers, October 8, 1918.

A board meeting was held at St. Louis, Mo., May 14, 1918, all members being present.

The tests being made on feathering wheels with the steamer *Nokomis* and on twin-screw propellers with the steamer *Inspector* at the end of the last fiscal year, described on pages 3405 to 3410, Part II, Annual Report Chief of Engineers, 1917, were continued until July 14, 1917, when, under instructions from the Chief of Engineers, the work was stopped and the boats and barges returned to St Louis, July 20, to be leased to private parties for use in towing iron ore and coal between St. Louis and St. Paul in relief of the general car shortage and congestion of railroad traffic. The *Inspector*, however, was thought not suitable for commercial towing operations and was returned to the Mississippi River Commission, and in its stead the sternwheel towboat *Sachem* was transferred to the lessee.

During the short period of test operations in July, tests were made on the *Nokomis* with feathering paddle wheels 17½ feet outside diameter and varying paddle widths of 42, 36, 30, and 24 inches. There remain to be completed the series of tests planned by the board with feathering wheels of constant center diameter of 14 feet and varying paddle widths of 36, 30, and 24 inches; also a series of tests with feathering wheels with constant diameter 10½ feet between inside edges of the paddles of the above widths.

Boiler and engine tests aggregating 19 hours were made on the *Nokomis* (equipped with Burke furnaces) en route from Keokuk to St. Louis, and on the subsequent up trip of the *Nokomis* from New Orleans (under the lease) boiler and engine tests, aggregating 81 hours, also were made April 20 to 27, 1918.

Wheel thrust tests with the screw propeller steamer *Inspector* were completed with the third set of propellers, completing the tests with propellers of the following blade areas and pitches: 14.25 square feet by 7.75 feet pitch, 17.9 square feet by 7.75 feet pitch, and 17.9 square feet by 8 feet pitch. The fourth set of propellers, having blade area of 21 square feet and with pitches variable at will between 5.5 feet and 5.75 feet were put in place, but only a dock test and a speed test ahead without tow were made before the boat was withdrawn from the service as stated. Boiler and engine tests aggregating 18 hours also were made on the *Inspector*, July 12 and 13, on runs of two days' duration between Keokuk and Burlington in addition to 41 hours' test en route to Keokuk from St. Louis in May, 1917.

Tests were made at Grafton, Ill., October 3 to 5, on the vacuum tunnel motor boat *Amazon*, built by the Shallow Water Boat Co. to determine the advantage of their vacuum tunnel feature. Thirty-four trips at different speeds were made over a mile course, in 16 cases starting with the tunnel exhausted and in 18 cases with the tunnel not exhausted. The advantage of this vacuum feature appears to be principally as an aid to quick starting, the gain in speed thereafter being very small. Starting tests were also made over a short course both with the tunnel exhausted and not exhausted. An advantage was shown in having the tunnel exhausted in starting rotation of the propeller as the boat then comes more quickly to normal speed, and there is no tendency in the propeller to race, as with an ordinary tunnel boat, during the time of expulsion of air from the tunnel. The boat handled well both going ahead and astern. The boat, drawing 12 inches, was operated in 18 inches of water, and as claimed by the builders, did not labor and produced but slight wake wave.

The notes and records of the boiler and engine tests of the *Inspector* (May and July, 1917) aggregating 59 hours, and those of the *Nokomis* (July, 1917, and April, 1918) aggregating 100 hours were reduced in accordance with the customary calculations of such tests for complete steam-power plants.

The observations of wheel thrust tests on the *Nokomis* and *Inspector*, made during 1917, also were reduced and curves plotted showing the comparative efficiencies and characteristics of the different wheels operated at various speeds and propelling different tows both ahead and astern; also the characteristics exhibited in dock tests ahead and astern and in tests over the courses without tows.

The office work has been very greatly impeded by the constant changing of the personnel of the observing and computing parties, the members continually resigning to enter military service.

For the purpose of continuing the test work outlined by the board, the large U. S. towboat *King* has been equipped with combination fire and water tube boilers, compound condensing engines and a feathering wheel so constructed that wheel diameters and paddle widths may be changed as desired, as with the *Nokomis*, making it possible to test 10 wheels of different dimensions with the present engines and with unaltered shaft position. The progress of installation has been greatly hindered by long delays in the delivery of machinery and appliances, it being impossible to obtain the parts needed and contracted for, or their transportation, except after the most vexatious delays. After the machinery was installed, a trial trip was made June 7 to 15 with the boat between St. Louis and Cairo, during which a study was made of the operation of the engines, boilers, furnaces, and other apparatus. A number of desired minor changes were noted which are being made at the close of the year.

Operation of leased plant.—The *Nokomis*, under the lease hereinbefore referred to, departed from St. Louis July 30 with five barges of coal, added an additional partly loaded barge at Keokuk and arrived at St. Paul August 14 without difficulty or incident. Of 2,917 tons of coal started up river 2,384 tons were delivered at St. Paul, the remainder being taken for fuel by the steamer up stream and down. Unloading the coal and loading the iron ore was very much delayed because of poor terminal facilities which had been hastily improvised at St. Paul, and the *Nokomis* departed downstream August 28 with 3,560 tons of ore loaded on the six steel barges and four smaller wooden barges obtained from the Rock Island Engineer District to accommodate a surplus of ore brought in by the railroad, which demanded release of its cars. On account of steadily falling river an extremely low stage had been reached before the departure, with resulting insufficient depth on the bars for a boat of such draft as the *Nokomis*. In consequence the boat and tow went aground many times on the downtrip with great loss of time and expense. Waiting for the channels to be deepened at several localities and for the river to rise so that the Rock Island Rapids could be passed also detained the boat so that arrival at St. Louis was not made until October 20.

After the iron ore had been unloaded at St. Louis the lessee contracted with the Quartermaster Department, United States Army, for towing to New Orleans about 9,000 tons of knocked-down railway cars, destined for use with the Army in France, and obtained for this transport four additional steel barges from the St. Louis Engineer District. Fifteen of the barges then under lease were loaded with car parts and the *Nokomis* departed down from St. Louis November 27 with a tow of eight loaded barges, arrived at Cairo December 1, left the tow at Cairo Point in the Ohio River below Cairo, where the whole tow was to be assembled, and returned to St. Louis December 3 for the remainder. The *Nokomis* again started downstream December 8 with seven barges of car parts and a barge of fuel, but encountering the first winter storm of great severity and so much running ice in the river, was forced to land about 1 mile below the city, where the vessels remained frozen in the ice until February 13. The same storm so listed with ice two of the barges left at Cairo that about 1,000 tons of their cargoes slid into the river. The U. S. snag boat *Wright* was sent immediately to assist in recovery of the lost cargoes, but little could be accomplished on account of extremely cold weather, running ice, and shortage of coal, all of which prevailed for the remainder of the winter.

During January there were several movements of heavy ice packs and gorges in the Ohio which forced the snag boat aground, sank two of the barges at their moorings, and carried one empty and three loaded barges of this fleet down the Mississippi. One of the truant vessels dumped its cargo in the ice field at Tennemo Landing. The two others with cargoes nearly intact were found at Hickman, Ky., and at Caruthersville, Mo., and the empty barge was recovered near Memphis. Many private vessels were also carried adrift and others were badly damaged or sunk. The winter was the severest known on the lower Ohio, and was accompanied by the greatest number and extent of gorges and floating ice and the damage done the greatest on record.

On February 25, after the winter ice had passed out, *Nokomis* departed downstream from St. Louis with eight barges, arrived at Cairo on the 26th and added to the tow three loaded barges which had wintered there, and, afterwards, a barge at Hickman and another at Caruthersville. The *Nokomis* then proceeded downstream with 13 barges, arrived at New Orleans, March 11, discharged cargo and began March 23, the return trip with the empty barges, left one barge en route at Memphis to be used in recovery of cargo lost at Tennemo, referred to, and arrived at St. Louis April 27, after a delay of nine days at Memphis to rebuild the brickwork of the furnaces. The *Nokomis* was returned from lease April 30 at the St. Louis engineer office, but the barges were retained by the lessee until June 30, when the lease expired. The 12 barges which were returned to St. Louis were cared for by the United States engineer depot and the remaining 4 are still at Memphis.

The cargoes lost at Cairo and Tennemo Landing were practically all recovered at the end of the year by divers and by the use of an electromagnetic derrick boat. The recovered parts are being overhauled at Memphis prior to shipment to original destination.

The *Sachem* which was leased to the same parties, arrived at St. Louis from Memphis, August 9, and after waiting for tow, departed upstream October 4, with six barges of coal, 2,600 tons, for St. Paul, but, at that late date in the low water season, was unable to ascend the Mississippi much above the mouth of the Illinois. In consequence, the tow was diverted up the Illinois River to Hennepin where four barge loads of coal were sold to the Rock Island engineer office, and the boat returned to Grafton where one part barge load of coal was left, also for the Rock Island engineer office. The *Sachem* then returned to St. Louis, arriving October 20, and the lease was terminated, the boat being transferred to the St. Louis Engineer District where it was used on construction and dredging work until December 10. It was then put in winter harbor with other plant and in the spring was returned to the Mississippi River Commission.

APPROPRIATIONS.

June 25, 1910	$500,000.00

CONTRACTS IN FORCE.

Name: Gillett, Eaton & Squire.

Work: Furnishing one pair tandem compound condensing engines for sternwheel towboat.

Price: $14,875.

Date of approval: December 15, 1917.

Date of beginning work: December 24, 1917.

Date of expiration: June 28, 1918.

Percentage of completion: 45 per cent.

ANNUAL REPORT OF THE MISSISSIPPI RIVER COMMISSION FOR THE FISCAL YEAR ENDING JUNE 30, 1918.

OFFICE, MISSISSIPPI RIVER COMMISSION,
St. Louis, Mo., July 24, 1918.

From: The Mississippi River Commission.
To: The Chief of Engineers, United States Army.
Subject: Annual Report for 1918.

The act of June 28, 1879, by which the commission was created, defines its duties in part as follows:

> To direct and complete such surveys of said river, between the Head of the Passes near its mouth to its headwaters as may now be in progress, and to make such additional surveys, examinations, and investigations, topographical, hydrographical, and hydrometrical, of said river and its tributaries as may be deemed necessary by said commission to carry out the objects of this act. * * * To take into consideration and mature such plan or plans and estimates as will correct, permanently locate, and deepen the channel and protect the banks of the Mississippi River; improve and give safety and ease to the navigation thereof; prevent destructive floods; promote and facilitate commerce, trade, and the postal service; * * *

Under the authority of this and subsequent acts making appropriations and relating to the subject, surveys and observations have been carried on and works of improvement under the authority and direction of laws making appropriations for that purpose have been undertaken and executed. The original project contained in the report of the Mississippi River Commission dated February 17, 1880, contemplated the permanent fixing and improvement of the channel to a depth of at least 10 feet at extreme low water by the contraction of the low-water width to about 3,000 feet, the protection of the banks against caving, and the control of the flood waters by means of levees. This report was the one upon which Congress made its first appropriation for the improvement of the Mississippi River under commission plans, thereby officially adopting such plans for the inauguration of this work.

When the Mississippi River Commission began the work of improvement there were few, if any, precedents of practical value to serve as guides in a project of such magnitude. But very meager data as to the regimen of the river were available, and a thorough knowledge of its many varying phases was essential before satisfactory comprehensive plans of improvement could be developed. Exhaustive surveys and observations of the physics of the river from the headwaters to the mouth were therefore inaugurated and carried on until the data needed were secured and experiments with various kinds of plant and material were also made in order to develop the equipment and type of construction needed for efficient work. This work occupied several years. During these years the appropriations were comparatively small, and sometimes failed altogether, with disastrous results to the channel works, so progress was necessarily slow. As a result of the knowledge of the regimen of the river acquired and the lessons taught by the experimental work, definite projects are now entered upon with confidence of success, but efforts looking to improved methods to secure greater efficiency and economy will be continued.

The earlier works were designed primarily for the rectification and improvement of the channel, and were confined to the Plum Point Reach, 147 to 186 miles, and Lake Providence Reach, 517 to 552 miles below Cairo. These reaches were selected because here the shifting sand bars and deficient depths were most pronounced and the low-water navigation most difficult. Highly beneficial results were obtained in the improvement of the channel depths in those reaches, and the work done in them confirmed the soundness of the theory upon which it was based, but also demonstrated that more substantial types of construction were needed and that the permanent improvement of the channel by contraction and revetment works would consume a long period of time, while the pressing needs of commerce called for immediate relief. The development in hydraulic dredging machinery had reached such a stage at this time as to hold out the hope that an immediate and economical solution of the problem of temporarily deepening the channel for navigation purposes might be found in the opening and maintenance of channels across the obstructing bars at each low-water season by means of dredging. After extended studies and experiments, hydraulic dredges of large capacity adapted to the peculiar service required were developed by the commission and this method of temporary improvement of the low-water channel was adopted with a view to maintaining a navigable channel not less than 250 feet in width and 9 feet in depth, and has been applied with success.

Since the adoption of dredging, the permanent work of channel improvement has been confined to the revetment of banks, and a type of revetment has been developed which successfully withstands the scouring action of the river. Concrete has been largely substituted for the upper bank revetment, and its use for sinking the present type of willow mat, as well as a possible substitute for the mat itself, is being tried out with a view to further economy and increased efficiency.

The extent of bank revetment is, however, relatively so great when compared to the funds available for its construction that it has been necessary to confine the work to cases of urgent necessity, such as caving banks which threaten cut-offs or the safety of large levees, which could only be replaced at excessive cost, and the harbor fronts of cities. Substantial revetment for the purpose of fixing the banks of the river is essential to any successful scheme of improvement, and as the project adopted by Congress requires that the commission shall "correct, permanently locate, and deepen the channel and protect the banks of the Mississippi River," large increase in expenditures for revetment construction are urgently needed.

An important item in the operation of the commission is the construction and general repair of levees, which was first authorized without qualifying restrictions by the act of September 19, 1890; and since that date about one-half of the appropriations made by Congress have been devoted to that purpose.

Briefly stated in general terms and quoting in part the several acts of Congress under which the project is being carried out, the work now in progress covers the Mississippi River from Rock Island, Ill., to the Head of the Passes, 1,568 miles, "the Ohio River from its mouth to the mouth of the Cache River," and "the Arkansas River between its mouth and the intersection thereof with the division line between Lincoln and Jefferson Counties," and it includes—

1. Flood protection by construction, extension, and repair of levees from Rock Island, Ill., to Head of the Passes, 1,568 miles; along the Ohio River below the mouth of the Cache River and the Arkansas River up to the Lincoln-Jefferson County line, in cooperation with the several States and levee boards, to "prevent destructive floods."

2. Continuation of improvement below the mouth of the Ohio River so as to "give safety and ease to navigation" of the Mississippi River at flood stages by facilitating the interchange of traffic, "commerce, trade, and the Postal Service, with a view to securing a permanent channel depth of 9 feet" by means of:

(a) Revetment of caving banks to "correct, permanently locate, and deepen the channel, and protect the banks of the Mississippi River," and for the preservation of harbors and the security of levees.

(b) Dredging, for the purpose of maintaining at all stages a "navigable channel 250 feet in width and 9 feet in depth," including construction, operation, and maintenance of suitable dredge boats and auxiliary devices and appliances therefor.

3. The maintenance of a navigable channel between the waters of the Mississippi, Red, and Atchafalaya Rivers.

4. Physical investigations, maintenance of gauges, and discharge measurements of the Mississippi River and its tributaries, preparation and publication of maps and physical data; surveys and investigations covering all phases of river regimen governing the work of channel improvement and flood control "from the headwaters of the Mississippi River to the Head of the Passes."

5. Other miscellaneous details incident to the execution of the general project.

LEVEE WORK ABOVE CAPE GIRARDEAU, MO.

The river and harbor act approved March 4, 1913, appropriated the sum of $200,000 for the purpose of making an examination of the Mississippi River from Cape Girardeau, Mo., to Rock Island, Ill.—

with a view to such improvements as will at the same time promote navigation, develop water power, and protect property adjacent to said river from damage by floods; * * * and for the building of such levees between said points upon the river in aid of navigation as may be found necessary or desirable by the commission and approved by the Chief of Engineers.

The river and harbor act approved July 27, 1916, provides that—

any funds which are herein, or may hereafter be, appropriated by Congress for improving the Mississippi River between Head of Passes and the mouth of the Ohio River, and which may be allotted to levees, may be expended, under the direction of the Secretary of War, in accordance with the plans, specifications, and recommendations of the Mississippi River Commission, as approved by the Chief of Engineers, for levees upon any part of said river between Head of Passes and Rock Island, Illinois, in such manner as, in their opinion, shall best improve navigation and promote the interests of commerce at all stages of the river.

The flood control act approved March 1, 1917, provides in paragraph (*c*) of section 1 that—

any funds which may hereafter be appropriated under authority of this act for improving the Mississippi River between the Head of the Passes and the mouth of the Ohio River, and which may be allotted to levees, may be expended upon any part of said river between the Head of the Passes and Rock Island, Illinois.

EXTENSION OF JURISDICTION OF THE MISSISSIPPI RIVER COMMISSION.

The river and harbor act approved July 27, 1916, provides:

> That the water courses connected with said river and the harbors upon it, now under the control of the Mississippi River Commission and under improvement, together with the harbor at Vicksburg, Mississippi, and the Ohio River from its mouth to the mouth of the Cache River, which are hereby transferred to and placed under the control and jurisdiction of such commission, may, in the discretion of said commission, upon approval by the Chief of Engineers, receive allotments for improvements now under way or hereafter to be undertaken, to be paid for from the amount herein appropriated.
>
> * * * * * * *
>
> *Provided further*, That no part of the improvement of the Ohio River, with a view to the construction of locks and dams, shall be considered as transferred to or placed under the control and jurisdiction of the Mississippi River Commission.

The same act provides that—

> The jurisdiction of the Mississippi River Commission is hereby extended so as to include that part of the Arkansas River between its mouth and the intersection thereof with the division line between Lincoln and Jefferson Counties, and any funds which are herein or may be hereafter appropriated by Congress for improving the Mississippi River between Head of Passes and the mouth of the Ohio River, and which may be allotted to levees and bank revetment, may be expended within the limits of said extended jurisdiction, under the direction of the Secretary of War, in accordance with the plans, specifications, and recommendations of the Mississippi River Commission, as approved by the Chief of Engineers, and upon like terms and conditions for levees and bank revetment upon any part of the Mississippi River now under the jurisdiction of said commission, and in such manner as will best promote and accomplish the purposes for which the commission was created, in so far as the territory hereby added to its said jurisdiction may be involved.

The flood-control act, approved March 1, 1917, further provides:

> That the water courses connected with the Mississippi River to such extent as may be necessary to exclude the flood waters from the upper limits of any delta basin, together with the Ohio River from its mouth to the mouth of Cache River, may, in the discretion of said commission, receive allotments for improvements now underway or hereafter to be undertaken.

POLICY ADOPTED BY THE MISSISSIPPI RIVER COMMISSION FOR WORK UNDER THE FLOOD-CONTROL ACT APPROVED MARCH 1, 1917.

"The Mississippi River Commission must be governed by and rigidly conform to the terms of the flood-control act, and the hearty cooperation of all levee boards is looked for in order to carry on the work of levee construction in a satisfactory and economical manner.

"The money to be appropriated under authority of the flood-control act is 'for controlling the floods and for the general improvement of the Mississippi River,' etc., and the amounts to be devoted to the construction of levees and other classes of work will, as heretofore, be determined by the Mississippi River Commission from time to time as appropriations are made, and in accordance with policy of the commission as heretofore adopted.

"Under the law the amount contributed by local interests for the construction or repair of any levee 'shall not be less than one-half of such sums as may have been allotted by the commission.' The commission will determine in each case what proportion is 'just and equitable' when the allotments of funds of successive appropriations are made. No funds can be expended by the commission under the flood-control act for levee work in any levee district 'between the Head of the Passes and Rock Island, Illinois,' unless the contribution of funds thereto required by law be first made.

"The amounts contributed by local levee boards must be in current funds, deposited in the United States Treasury or acceptable depository, to the credit of the Mississippi River Commission. In accordance with a ruling of the Treasury Department, interest accruing, if any, on such deposits, may be payable by the depository to the levee boards which have made such deposits in compliance with the law.

"The terms of the flood-control act prohibit the expenditure of funds for levee purposes in any levee district unless a minimum of one-third of the amount required is contributed by the said district.

"No credit will be given to any levee district for work done or money expended on the construction of levees prior to the allotment of funds therefor by the commission from the appropriations authorized by the flood-control act, and contributions from levee boards required by law must be in current funds.

"All levee construction and the disbursement of funds from commission allotments and the contributions from levee districts shall be under the direction of the Mississippi River Commission and its authorized agents.

"No money allotted by the commission under authority of the flood-control act can be expended for right of way but 'all such rights of way must be provided free of cost to the United States' by the several levee districts; furthermore, 'no money paid as expenses incurred by any State or levee district in securing such right of way or in any temporary works of emergency, or for the maintenance of any levee line, shall be computed as a part of the contribution of such State or levee district' toward the allotment made by the commission.

"The maintenance of a completed levee, constructed in whole or in part under the flood-control act, must be cared for by the levee district protected thereby.

"Competent experienced engineers and inspectors in the service of the levee boards may be transferred to the service of the commission, under civil service regulations, as the exigencies of the work may require.

"Section (*b*) of the flood-control act provides that contributions from levee districts apply solely to the construction and repair of levees. Revetment work, therefore, is regarded as exempt from the ratio of contribution prescribed by this law."

A resolution passed by the Mississippi River Commission, July 12, 1917, requires—

> that each levee district on the Mississippi River under the control of the Mississippi River Commission be advised that the cash contribution for the construction of levees in such district, after an allotment of funds by the Mississippi River Commission under the provisions of the flood-control act, approved March 1, 1917, must be made within 90 days after notice of such allotment, except where the commission specially authorizes other action.

APPROPRIATIONS AND ALLOTMENTS.

Since the creation of the Mississippi River Commission there has been appropriated and allotted for expenditure under it on the Mississippi River and tributaries $96,375,610.68.

From the appropriation of $6,000,000 carried in the sundry civil act of June 12, 1917, for carrying out the provisions of the flood-control act approved March 1, 1917, an allotment of $5,660,000 was approved by the Secretary of War June 22, 1917, for the work of the Mississippi River Commission. On recommendation of the commission, allotments were made during the year as follows:

SECRETARY.

Mississippi River Commission	$50, 000
Surveys, gauges and observations	40, 000
Dredges and dredging	350, 000
New steamer	196, 000
Levees—Cape Girardeau, Mo., to Rock Island, Ill.:	
Rock Island to New Boston, Ill	55, 000
Muscatine to mouth of Iowa River, Iowa	30, 000
Warsaw to Quincy, Ill	55, 000
Mouth of Des Moines River to La Grange, Mo	20, 000
La Grange to mouth of Missouri River, Mo	70, 000
Grand Tower to Gale, Ill	50, 000
	916, 000

FIRST AND SECOND DISTRICTS.

Revetment:	
Gayoso, Mo	50, 000
Barfield, Ark	100, 000
Porter Lake, Ark	130, 000
Old Town Bend, Ark	40, 000
General repairs and stone	35, 000
Osceola, Ark	45, 000
Revetment plant:	
12 new wooden barges	65, 000
1 new gravel dredge	15, 000
6 new gravel barges	48, 000
Care and repair of plant	75, 000
Memphis harbor (dipper dredge, $65,000; examination and bar removal, $185,000)	250, 000
Surveys	5, 000
Levees:	
Upper St. Francis levee district	90, 000
Reelfoot levee district	10, 000
Lower St. Francis levee district	450, 000
White River levee district	110, 000
	1, 518, 000

THIRD DISTRICT.

Revetment:	
Greenville, Miss	40, 000
Ashbrook Neck, Miss	102, 000
Fitlers, Miss	130, 000
Princeton, Miss	120, 000
Reid-Bedford, La	52, 000
Cottonwood, Miss	140, 000
Grand Lake, Ark	80, 000
General repairs and stone	50, 000
Plant:	
New hull for tug Parker	10, 000
Gravel dredge	20, 000
Gasoline launch	3, 000
Care and repair	75. 000
Surveys	5, 000

Levees:	
Lower Yazoo levee district	$510,000
Upper Tensas levee district	420,000
	1,757,000

FOURTH DISTRICT.

Revetment:	
Hard Times Bend, La.	25,000
Bondurant Chute, La.	25,000
Kempe Bend, La.	100,000
Giles Bend, Miss.	35,000
Marengo Bend, La.	30,000
Natchez Front, Miss.	10,000
Grand Bay, La.	150,000
Plaquemine, La.	75,000
New Orleans Harbor, La.	150,000
General repairs and stone	34,000
Plant, care and repair	75,000
Atchafalaya and Red Rivers	15,000
Surveys	5,000
Levees:	
Lower Tensas levee district	315,000
Atchafalaya levee district	130,000
Lafourche levee district	85,000
Ponchartrain levee district	80,000
Barataria levee district	80,000
Lake Borgne levee district	50,000
	1,469,000

The following reallotments of funds from prior appropriations have been made during the year:

SECRETARY.

From 1913 allotment for levees La Grange to mouth of Missouri River, Mo., to levees Rock Island to New Boston, Ill.	$2,146.28
From 1916 allotment for levees, head Chouteau Island to Prairie du Pont, Ill., to levees—	
Muscatine to Iowa River, Iowa	5,500.00
Warsaw to Quincy	5,600.00

FIRST AND SECOND DISTRICTS.

From 1916 allotment for revetment, Bullerton, Ark., to—	
Revetment, Norfolk, Miss.	40,000.00
Lower St. Francis levee district	40,000.00
From 1914-15 river and harbor acts to levee, Upper St. Francis levee district	170,015.47
From 1913 allotment for Helena, Ark., to revetment Osceola, Ark.	25,000.00

THIRD DISTRICT.

From allotment for Lower Yazoo levee district, $20,000, and Reid-Bedford Bend, $30,000, to plant, third district	50,000.00

In addition to the above the sum of $9,100 was allotted by the Chief of Engineers for the fiscal year ending June 30, 1918, from the permanent indefinite appropriation made by act of August 11, 1888, as amended by act of June 13, 1902, for gauging the waters of the Mississippi River and its tributaries, which is applied to the maintenance of certain river gauges.

Statement of condition of "funds contributed by local levee districts under flood-control act," fiscal year 1918, in hands of Brig. Gen. W. H. Bixby, United States Army, retired.

Levee district.	Bank in which funds are deposited.	Amount contributed.	Amount withdrawn and deposited to Treasurer, United States during fiscal year 1918.	Balance available June 30, 1918.
Secretary:				
Muscatine-Louisa Island levee district (Muscatine to mouth of Iowa River.)	First National Bank, Muscatine, Iowa.	$15,000.00	$5,000.00	$10,000.00
Drury drainage district (Rock Island to New Boston, Ill.)	Hershey State Bank, Muscatine, Iowa.	27,500.00	10,000.00	17,500.00
Hunt drainage district (Warsaw to Quincy, Ill.).	The Hill-Dodge Banking Co., Warsaw, Ill.	27,500.00	5,000.00	22,500.00
Riverland levee district (La Grange to mouth of Missouri River, Mo.).	Ayers National Bank, Jacksonville, Ill.	33,000.00	5,000.00	28,000.00
East Cape Girardeau and Clear Creek drainage district (Grand Tower to Gale, near Thebes, Ill.).	Alexander County National Bank, Cairo, Ill.	25,000.00	10,000.00	15,000.00
Gregory drainage district (mouth of Des Moines River to La Grange, Mo.).	Treasurer, United States......	7,200.00	7,200.00	....
		135,200.00	42,200.00	93,000.00
First and second districts:				
Mississippi County levee board (Upper St. Francis levee).	Charleston Bank, Charleston, Mo.	45,000.00	....	45,000.00
Fulton County levee board (Reelfoot levee).	Treasurer, United States......	5,000.00	5,000.00	....
St. Francis levee board of Missouri (Lower St. Francis levee).	First National Bank, Caruthersville, Mo.	22,000.00	22,000.00	....
St. Francis levee board of Arkansas (Lower St. Francis levee).	National City Bank, Memphis, Tenn.	225,500.00	....	225,500.00
Laconia levee district (White River levee).	St. Louis Union Bank, St. Louis, Mo.	55,000.00	55,000.00	....
		352,500.00	82,000.00	270,500.00
Third district:				
City of Greenville, Miss.........	Citizens Bank, Greenville, Miss.	[1] 13,000.00	13,000.00	....
Southeast Arkansas levee district (Upper Tensas levee).	Desha Bank & Trust Co., Arkansas City, Ark.	46,666.67	5,000.00	41,666.67
Mississippi levee commissioners (Lower Yazoo levee).	Commercial Savings Bank, Greenville, Miss.	[2] 292,501.00	222,501.00	70,000.00
Tensas Basin levee district (Upper Tensas levee).	The Richland State Bank, Rayville, La.	92,000.00	44,000.00	48,000.00
Fifth Louisiana levee district (Upper Tensas levee).	First National Bank, Vicksburg, Miss.	71,334.00	61,334.00	10,000.00
		515,501.67	345,835.00	159,666.67
Fourth district:				
Fifth Louisiana levee district (Lower Tensas levee).	First National Bank, Vicksburg, Miss.	157,500.00	....	157,500.00
Buras levee board (Barataria levee).	Whitney-Central Trust & Savings Bank, New Orleans.	8,000.00	....	8,000.00
Lake Borgne levee district (Lake Borgne levee).	.....do........................	25,000.00	....	25,000.00
Lafourche Basin levee district (Lafourche and Barataria levees).	.....do........................	74,500.00	....	74,500.00
Pontchartrain levee district......	.....do........................	40,000.00	....	40,000.00
Atchafalaya Basin levee board..	Bank of Baton Rouge, Baton Rouge, La.	65,000.00	....	65,000.00
		370,000.00	....	370,000.00

---

[1] For revetment.

[2] Includes $22,500 for revetment.

June 30, 1918:

Amount received during fiscal year, 1918..	$1,373,201.67
Amount deposited to Treasurer, United States, during fiscal year..........................	470,035.00
Balance available, June 30, 1918..	903,166.67

MISSISSIPPI RIVER COMMISSION.

Commissioners.—The commissioners during the fiscal year were Col. J. G. Warren, Corps of Engineers, United States Army, acting president to July 10; Brig. Gen. W. H. Bixby, United States Army, retired, acting president, July 10–18, president from July 18, 1917; J. A. Ockerson, civil engineer; Homer P. Ritter, hydrographic and geodetic engineer, United States Coast and Geodetic Survey; Charles H. West, civil engineer; Col. Lansing H. Beach, Corps of Engineers, United States Army; and Edward A. Glenn.

Secretary and district engineers.—The following engineers were on duty under the commission during the year: Secretary, Lieut. Col. Clarke S. Smith, Corps of Engineers, United States Army, to August 23; Brig. Gen. W. H. Bixby, United States Army, retired, from August 23 to November 10; E. J. Thomas, assistant engineer, from November 10, 1917. First and second districts engineer, Lieut. Col. G. P. Howell, Corps of Engineers, United States Army, to November 9; Montgomery Gardner, assistant engineer, from November 10, 1917. Third district engineer, Maj. John R. Slattery, Corps of Engineers, United States Army, to August 27; Lieut. Col. G. P. Howell, Corps of Engineers, United States Army, from August 27 to September 24; A. M. Todd, assistant engineer, from September 24, 1917. Fourth district engineer, Lieut. Col. G. McC. Derby, United States Army, retired.

Sessions.—Four sessions of the commission were held during the fiscal year. The one hundred and thirty-ninth session, July 10–12, 1917, was held in the offices of the commission, International Life Building, St. Louis, Mo. The one hundred and fortieth session was held at Memphis, Tenn., August 2. The one hundred and forty-first and one hundred and forty-second sessions were held on board the steamer *Mississippi* during inspections of the river from St. Louis, Mo., to New Orleans, La., November 13–23, 1917, and April 16–24, 1918, respectively.

At these sessions public hearings were given to representatives of the navigation, levee, commercial, and other interests of the river.

SURVEYS, GAUGES, AND OBSERVATIONS.

The general survey of the Mississippi River has been completed from Head of Passes to its headwaters, and the maps and charts published. A resurvey of the river from Cairo to the mouth of Red River, a distance of 772 miles, was completed in 1914, the reduction of field notes and mapping has been completed. A contract has been let for the printing of maps, scale 1 inch=1 mile, and charts, scale 1:20,000, of the resurvey, and is now about 24 per cent completed.

The reduction of field notes of the survey of the Atchafalaya River from Red River to Morgan City, La., is in progress, the reduction and platting are about 60 per cent completed.

Discharge observations of the river and many of its tributaries have been made at high and low water, river and tide gauges maintained, and other physical data collected. (For details see Appendix 1.)

DREDGES AND DREDGING.

For the purpose of maintaining a channel at least 9 feet deep and 250 feet in width at all stages of the river, 10 dredges have been constructed. A navigable channel has been maintained since 1895, and a channel of project dimensions has been maintained since 1902, except as follows: For 18 days in 1903 and a few days in 1904, the depths at one bar were 8 and 8½ feet. For a few days there was a depth of between 8 and 9 feet at five bars in 1908, seven bars in 1910, five bars in 1914, two bars in 1916, and one bar in 1917. For a few days there was a depth of between 7 and 8 feet at one bar in 1908. For a few days at one bar in 1913, and four bars in 1916, the required width was not maintained.

During the dredging season of 1917, four dredges were used and maintained the project depth of 9 feet with width of 250 feet at all bars below Cairo with the exception of the bar at the mouth of Red River where a least depth of 8 feet prevailed for a short time prior to dredging at this place.

The river was comparatively high on the first of August, the gauge at Cairo reading 25.2 feet. After the first week in August the fall was slow, remaining above 10 feet until September 24. With exception of one short rise that crested at 19.2 feet on the Cairo gauge, on November 9, the river remained at a low stage until the end of December, at which date navigation was closed by ice at various points above Helena, Ark., and continuously above Columbus, Ky.

The dredges were in the field from August 9 until December 31, except that the *Gamma* which had been working at entrance to Old River and was delayed by shortage of coal and running ice, did not reach the dredge fleet at West Memphis, Ark., until February 15, 1918. (For details see Appendix 1.)

Navigation was stopped during the period December 9, 1917, to February 13, 1918, on account of abnormal ice conditions. At one time a gorge of broken ice was continuous from Cairo down to Columbus, a distance of 21 miles, and other enormous similar gorges existed for several days each at Barfield, Osceola, Richardsons, and Seyppels, respectively 142, 165, 185, and 260 miles below Cairo. Above Cairo the ice was unbroken and continuous for several weeks.

REVETMENT WORK.

There is summarized in the following table the total lengths of the existing revetments and the amounts constructed during the year. (For details see Appendixes 2, 3, and 4.)

Mississippi River, mouth of the Ohio River to Head of Passes—effective length of bank protection, June, 1918, and length built during the year.

Locality.	Miles below Cairo.	Bank of river.	Built during the year.	Revetment in place.
			Lin. ft.	*Lin. ft.*
Columbus, Ky	21	Left		2,200
Hickman, Ky	36	....do		1,400
Slough Landing Neck, Tenn	60	....do		16,304
New Madrid, Mo	71	Right		4,450
Gayoso Bend, Mo	106	....do	2,200	7,778
Caruthersville, Mo	110	....do		2,400
Barfield, Ark	141	....do	2,822	6,297

Mississippi River, mouth of the Ohio River to Head of Passes—effective length of bank protection, June, 1918, and length built during the year—Continued.

Locality.	Miles below Cairo.	Bank of river.	Built during the year.	Revetment in place.
Plum Point Reach:			*Lin. ft.*	*Lin. ft.*
Daniels Point, Ark	152	Right		
Ashport, Tenn	155–159	Left		
Fletchers Bend, Ark	158–161	Right		75,380
Osceola, Ark	163–165	do		
Bullerton Bar, Ark	168	do		
Golden Lake, Ark	192	do		3,000
Hopefield Bend, Ark	227–230	do		14,800
Memphis, Tenn	230–232	Left		14,800
Tennessee Chute, Tenn	237	do		1,000
Norfolk, Miss	254	do	1,004	1,004
Star Landing, Miss	257	do		7,535
Porter Lake, Ark	261	Right	2,790	8,012
Walnut Bend, Ark	281	do		7,100
Trotters Landing, Miss	304	Left		6,025
Helena, Ark	306	Right		5,000
Delta, Miss	315	Left		7,195
Old Town Bend, Ark	324	Right	2,484	8,484
Sunflower, Miss	355	Left		9,070
Red Fork, Ark., Arkansas River	402	Right	3,000	4,200
Lake Bolivar Front	417	Left		8,640
Ashbrook Neck	446	do	1,100	12,250
Panther Forest	452	Right		7,500
Leland Neck, Ark	471	do		5,000
Greenville, Miss	478	Left	1,070	23,000
Vaucluse, Ark	487	Right		3,925
Longwood, Miss	500	Left		4,200
Grand Lake, Ark	510	Right		8,500
Princeton, Miss	514	Left	700	700
Lake Providence Reach:				
Louisiana Bend	522	Right		11,300
Lake Providence, La	540	do		12,000
Fitlers Bend, Miss	550	Left	4,750	13,200
Cottonwood, Miss	558	do	2,000	9,900
Albemarle Bend, Miss	568	do		13,720
Delta Point, La	598	Right		5,900
Vicksburg, Miss	599	Left	2,500	4,300
Reid-Bedford Bend, La	603	Right	460	7,230
Hard Times Bend, La	633	do		7,089
Bondurant	643	do		4,150
Kempe	658	do		28,616
Giles Bend	687–691	Left		20,917
Marengo Bend	693	Right		12,844
Natchez Front	700	Left		3,536
Grand Bay	808	Right		3,180
Plaquemine, La	854	do		6,370
Avondale, La	953	do		1,615
New Orleans Harbor	960–970	Right and left	1,035	56,750
Total			[1] 27,915	[2] 512,886

[1] 5.29 miles.

[2] 97.14 miles.

MEMPHIS HARBOR.

Repairs were made to the revetment just below the river and rail incline, and a channel along the paved wharf was maintained by dredging. Dredging was continued in Loosahatchie and Wolf Rivers, and in the harbor proper, by which a channel was maintained throughout the year deep enough and wide enough for the needs of all boats desiring to use the harbor.

RIVER STAGES DURING THE YEAR.

The stage of the Mississippi River remained moderately high until the early part of August, remaining above 20 feet on the Cairo gauge until August 6. From August 6 to September 22 the stage declined gradually, the gauge reading 10.4 feet on September 23. The river remained practically stationary and below 10 feet, with exception of 4 days, until October 27, when a rise set in that crested at 19.2 feet on November 9. The river again fell and the lowest stage of the year, 4 feet (due partly to ice dams in the upper rivers), was reached on December 16 and 17. The river remained below 10 feet until the end of December, when the formation of an ice gorge near Columbus, Ky., 21 miles below Cairo, caused a rise which crested at 37.4 feet on January 30, when the ice gorge near Columbus went out and the river fell at first rapidly and then slowly to 27.3 feet. Heavy rains and mild weather in the early part of February produced another rise which crested on February 25 at 39.8 feet, this being the highest reading, at Cairo, for the year.

LEVEES.

For convenience in administration and allotment of funds for levee purposes, the river front below Cape Girardeau, Mo., has been divided by the commission into levee districts. The names and locations of these districts as now established by the commission are as given on pages 3718–3719 of report of the Chief of Engineers for 1912. Levee construction from Cape Girardeau, Mo., to Rock Island, Ill., provided for by the river and harbor act approved July 27, 1916, and the flood-control act approved March 1, 1917, is in charge of the secretary, Mississippi River Commission, and the names and descriptions of localities to which allotments have been made are as follows:

Left bank from Rock Island to New Boston, Ill. ([1]507 to 458).
Right bank from Muscatine to mouth of Iowa River, Iowa. ([1]481 to 460).
Left bank from Oquawka to Dallas, Ill. ([1]441 to 414).
Left bank from Warsaw to Quincy, Ill. ([1]381 to 348).
Right bank from mouth of Des Moines River to La Grange, Mo. ([1]381 to 356).
Right bank from La Grange to mouth of Missouri River, Mo. ([1]357 to 208).
Left bank from Quincy to Hamburg Bay, Ill. ([1]348 to 282).
Left bank, head of Chouteau Island to Prairie du Pont, Ill. ([1]208 to 185).
Left bank, Grand Tower to Gale, near Thebes, Ill. ([1]84 to 48).

The following table, which is similar to that given in previous reports, has been brought up to date and shows the present condition of levees below Cape Girardeau, and levee operations during the past year, as compiled from the reports of the district engineers:

Levee district.	In system.	Built.	Contents, 1917.	Built since by United States.	Built since by local authorities.	Total built since 1917.
	Miles.	*Miles.*	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*
Upper St. Francis	87.00	67.00	6,381,303	877,755	....	877,755
Lower St. Francis	218.00	211.00	43,869,142	1,353,696	291,418	1,645,114
White River	74.00	74.00	16,052,663	635,368	181,924	817,292
Reelfoot	21.00	21.00	2,719,368	169,347	....	169,347
Upper Yazoo	124.00	124.00	38,106,392	....	604,958	604,958
Lower Yazoo	206.30	185.20	53,271,514	[2] 1,269,742	[3] 584,059	1,853,801
Upper Tensas	[4] 240.5	191.3	54,062,474	1,387,144	772,235	2,159,379
Lower Tensas	157.50	150.50	30,951,973	565,190	355,482	920,672
Atchafalaya	127.40	127.40	25,746,683	1,242,151	896,723	2,138,874
Lafourche	82.30	82.30	12,634,839	1,151,532	982,981	2,134,513
Barataria	71.15	71.15	4,792,433	154,834	108,511	263,345
Pontchartrain	125.35	125.35	22,425,506	1,240,820	578,221	1,819,041
Lake Borgne	78.13	78.13	5,600,172	176,782	167,863	344,645
Total	1,612.63	1,508.33	316,614,462	10,224,361	5,524,375	15,748,736

---

[1] Miles above Cairo.
[2] 537,276 cubic yards Ashbrook Dike not included.
[3] 3,315 cubic yards in sublevees not included.
[4] 176.7 miles along Mississippi River and 63.8 miles along Arkansas River.

Levee district.	Lost or abandoned during the year.	Contents, 1918.	Required to complete.	Estimated final contents.	Per cent now built.	Approximate area protected.
	Cubic yards.	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*		*Sq. miles.*
Upper St. Francis	....	7,259,058	7,035,381	14,294,439	50.7	700
Lower St. Francis	....	45,514,256	6,494,744	52,009,000	87.5	3,500
White River	....	16,869,955	11,641,045	28,511,000	59.2	910
Reelfoot	....	2,888,715	1,139,285	4,028,000	71.7	310
Upper Yazoo	....	38,711,350	2,920,650	41,632,000	93.0	3,281
Lower Yazoo	180,000	54,945,315	32,099,462	87,044,777	63.1	3,367
Upper Tensas	865,000	55,356,853	82,008,310	83,365,163	66.4	2,675
Lower Tensas	273,863	31,598,782	14,026,192	45,624,974	69.3	2,080
Atchafalaya	761,214	27,124,343	12,927,705	40,052,048	67.7	6,085
Lafourche	383,581	14,385,771	2,871,285	17,257,056	83.4	2,020
Barataria	125,067	4,930,711	843,201	5,773,912	85.4	
Pontchartrain	538,741	23,705,806	8,463,358	32,169,164	73.7	1,816
Lake Borgne	178,430	5,766,387	626,369	6,392,756	90.2	
Total	3,305,896	329,057,302	129,096,987	458,154,289	71.8	26,744

The column "Estimated final contents" of the levees given above is based on grades as revised on April 19, 1914, and sections provisionally established by the commission.

The work above Cape Girardeau (restricted by law to levee construction) is summarized in the following table:

Name of levee.	In system.	Built.	Contents, 1917.	Built since by United States.	Built since by local authorities.	Total built since 1917.
	Miles.	*Miles.*	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*
Duury drainage	8	8	312,360	....	....	....
Muscatine Island	13	13	222,000	42,250	....	42,250
Henderson County No. 1	8	8	850,000	....	....	....
Gregory	5	5	....	40,285	238,338	278,623
Hunt and Lima Lake	11	4	1,014,000	116,876	....	116,876
Sny Island	54	8	3,718,326	52,879	....	52,879
Riverland	7	2.8	22,085	161,835	....	161,835
Elsberry	11	11	562,000	....	....	....
East Side Levee and Sanitary	21	21	2,597,411	34,824	....	34,824
East Cape Girardeau and Clear Creek	11	4	413,645	91,937	....	91,937

Name of levee.	Abandoned during year.	Contents, 1918.	Required to complete.	Estimated final contents.	Per cent now built.	Approximate area protected.
	Cubic yards.	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*		*Acres.*
Drury drainage	....	312,360	560,000	872,360	35.8	5,300
Muscatine Island	13,000	251,250	490,000	741,250	34.0	22,000
Henderson County No. 1	....	850,000	135,000	985,000	86.3	7,680
Gregory	....	278,623	....	278,623	100.0	8,000
Hunt and Lima Lake	48,000	1,070,242	462,000	1,532,242	70.0	29,500
Sny Island	....	3,771,205	1,950,000	5,721,205	65.9	110,000
Riverland	....	183,920	496,080	680,000	27.0	6,229
Elsberry	....	562,000	....	562,000	100.0	19,000
East Side Levee and Sanitary	....	2,632,235	....	2,632,235	100.0	61,645
East Cape Giaredeau and Clear. Creek	29,027	476,555	287,760	764,315	62.3	9,392

Two types of levee machine have been constructed and purchased by the commission, and are in successful operation. In addition, several contractors have installed similar machines. As a result of this development of a suitable machine for levee construction, the amount of levee work that can be done annually is practically limited only by the amount of funds available therefor. (For details see Appendixes 3 and 4.)

There were no crevasses, no serious injuries to levees or revetments, no cut-offs, no overflowed areas outside the river banks, during the year.

CONDITION OF CHANNEL AT END OF FISCAL YEAR.

With the exception of periods of ice blockades and other rare periods of brief duration, there is now in the Mississippi River a good continuous navigable channel at all stages of the river and at all times of the year, with a depth of 9 feet or more and a width of at least 250 feet for a distance of 833 miles below Cairo, and a depth of not less than 30 feet with a width of several hundred feet at all times for the remaining 227 miles to the Head of Passes. This navigable channel is also of ample width and of at least 14 feet in depth from Cairo to the Gulf of Mexico during five to eight months of each year when high stages of river prevail.

The following are depths and widths for the different stretches of the river below Cairo that can usually be relied upon during the lowest stages of the year:

Cairo to Memphis, Tenn., 230 miles, least depth 9 feet for width of 250 feet. Low-water channel maintained by dredging.

Memphis to Vicksburg, Miss., 370 miles, least depth 9 feet for width of 250 feet. Low-water channel maintained by limited amount of dredging.

Vicksburg to Baton Rouge, La., 233 miles, least depth 11 feet for width of 250 feet or more. Low-water channel maintained by a limited amount of dredging at rare intervals.

Baton Rouge to New Orleans, La., 134 miles, least depth 35 feet for width of several hundred feet. No dredging.

New Orleans to Quarantine Station, La., 92 miles, least depth 62 feet for width of several hundred feet. No dredging.

At mean low water there is an available depth of 31½ feet to the Gulf through South Pass and 24 feet through Southwest Pass, as reported by the district engineer, New Orleans, La.

Estimate of funds required.—The flood control act provides "that not more than $10,000,000 shall be expended therefor during any one fiscal year." The full amount can be profitably expended in the fiscal year ending June 30, 1920, provided it is made available by Congress prior to the commencement of such year, and exclusive of the balance unexpended July 1, 1919, all balances being needed at the end of each year as a reserve from which to pay outstanding liabilities, contract reserves, and to meet local contributions in the manner provided for by the flood-control act.

Wm. H. Bixby,
Brig. General, U. S. Army, Retired,
President, Mississippi River Commission.
J. A. Ockerson,
Civil Engineer.
Homer P. Ritter,
Hydrographic and Geodetic Engineer,
U. S. Coast and Geodetic Survey.
J. G. Warren,
Colonel, Corps of Engineers, United States Army.
C. H. West,
Civil Engineer.
Lansing H. Beach,
Colonel, Corps of Engineers, United States Army.
Edward A. Glenn.

Money statements.

APPROPRIATIONS EXPENDED UNDER MISSISSIPPI RIVER COMMISSION.

Appropriation for Mississippi River.

July 1, 1917, balance unexpended		[1] $3,529,369.21
Miscellaneous receipts from sales of Engineer property, rentals, etc.		27,425.27
		3,556,794.48
June 30, 1918, amount expended during fiscal year		2,636,514.44
July 1, 1918, balance unexpended		920,280.04
July 1, 1918, outstanding liabilities	$186,545.75	
July 1, 1918, amount covered by uncompleted contracts	411,041.40	
		597,587.15
July 1, 1918, balance available		322,692.89
Distributed as follows:		
Mississippi River Commission		509.45
Surveys, gauges and observations		122.79

---

[1] The amount, $3,518,003.72, reported in annual report for 1917, has been increased $11,365.49, as follows:

Increased by refundments—	
By the secretary—	
November, 1917, voucher 151, March, 1917 (to surveys, gauges, and observations)	$1.15
November, 1917, vouchers 1 and 4, March, 1917 (to dredges and dredging)	16.01
By the first and second districts officer—	
August, 1917, correction in overpayment, by cancellation of check No. 2342, dated May 12, 1913 (to Reelfoot levee district)	48.00
September, 1917, voucher in February, 1917 (to Barfield, Ark.)	1.00
By the third district officer—	
July, 1917, voucher 124, February, 1917 (to Red Fork, Ark.)	8.00
August, 1917, voucher 20, January, 1917 (to Cottonwood, Miss.)	.11
October, 1917, voucher 194, May, 1917 (to lower Yazoo levee district)	362.88
December, 1917, voucher 157, June, 1917 (to upper Tensas levee district)	5.00
	487.10
Increased by reimbursement from St. Louis office for coal, credited to allotment for "dredges and dredging," secretary's office (ED 104197–723)	451.28
Increased by reimbursement from United States Engineer office, Little Rock, Ark., for repairs to dredge *H. S. Taber*, credited to allotment for "dredges and dredging," secretary's office (ED 104197–1610)	1,277.87
Increased by reimbursement from St. Louis district office for coal, credited to allotment for "Gayoso Bend, Mo.," first and second districts	270.00
Increased by reimbursement from appropriation "Pay, etc., of the Army" for expenditures pertaining to that appropriation, credited to allotment for "lower St. Francis levee district," first and second districts	288.10
Increased by reimbursement from Quartermaster General for payment made on voucher 196, June, 1917, for pay and commutation, credited to allotment for "Reid-Bedford Bend, La.," third district	65.56
Increased by reimbursements from United States Employees' Compensation Commission for treatment of injured employees, credited to allotments as follows, third district:	
"Lower Yazoo levee district"	14.00
"Vicksburg, Miss."	87.00
"Repairs to existing works and stone"	25.00
"Plant"	118.80
Increased by reimbursement from appropriation "Pay, etc., of the Army" for pay and commutation of quarters credited to allotment for "Lower Tensas levee district," fourth district	298.00
Increased by reimbursement from New Orleans, La., Engineer district for construction of barges, credited to allotment for "plant," fourth district (ED 69359–56 and 59)	8,092.78
	11,365.49

Levees, Head of the Passes to Rock Island, Ill	133,324.43
Revetment and contraction works, permanent channel improvement and protection	141,273.72
Dredges and dredging	33,823.43
Plant and miscellaneous	16,808.58
Improving harbors and tributaries except Vicksburg Harbor	—3,169.51
	322,692.89

APPROPRIATION FOR MAINTENANCE AND IMPROVEMENT OF EXISTING RIVER AND HARBOR WORKS.

July 1, 1917, balance unexpended:			
Under act of Oct. 2, 1914		$314,722.69	
Under act of Mar. 4, 1915		[1] 475,732.03	
			[2] $790,454.72
Miscellaneous receipts from sales of Engineer property:			
Under act of Mar. 4, 1915			102.55
			790,557.27
June 30, 1918, amount expended during fiscal year:			
Under act of Oct. 2, 1914		$80,900.15	
Under act of Mar. 4, 1915		211,747.69	
			292,647.84
July 1, 1918, balance unexpended:			
Under act of Oct. 2, 1914		233,822.54	
Under act of Mar. 4, 1915		264,086.89	
			497,909.43
July 1, 1918, outstanding liabilities:			
Under act of Mar. 4, 1915		148,000.00	
July 1, 1918, amount covered by uncompleted contracts:			
Under act of Oct. 2, 1914	$232,185.26		
Under act of Mar. 4, 1915	95,708.70		
		327,893.96	
			475,893.96
July 1, 1918, balance available:			
Under act of Oct. 2, 1914		1,637.28	
Under act of Mar. 4, 1915		20,378.19	
			22,015.47

Distributed as follows:

Levees, Head of the Passes to Rock Island, Ill	22,015.47

---

[1] The amount, $474,537.58, reported in annual report for 1917, has been increased $1,194.45, as follows:

Increased by refundments—	
By the secretary—	
November, 1917, voucher 86, January, 1917 (to dredges and dredging)	$0.09
By the first and second districts officer—	
September, 1917, voucher in February, 1917 (to lower St. Francis levee district)	.96
	1.05
Increased by reimbursement from Little River drainage district for expenditures in that district, credited to allotment for "upper St. Francis levee district," first and second districts	995.34
Increased by reimbursement from appropriation "Pay, etc., of the Army" for expenditures pertaining to appropriation named, credited to allotment for "upper St. Francis levee district," first and second districts	183.06
Increased by appropriation reimbursement for expenditure in March, 1917, on work at Star Landing, Miss., credited to allotment for "general repairs, and stone," first and second districts	15.00
	1,194.45

[2] The amount, $789,260.27, reported in annual report for 1917, has been increased $1,194.45 by refundments, etc., as shown in footnote [1] above.

APPROPRIATION FOR GAUGING WATERS OF THE MISSISSIPPI RIVER AND ITS TRIBUTARIES.[1]

July 1, 1917, balance unexpended		[2] $1,776.36
Amount allotted by Chief of Engineers, from permanent annual appropriation made by section 6 of river and harbor act of Aug. 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902		9,100.00
		10,876.36
June 30, 1918, amount expended during fiscal year	$8,217.85	
June 30, 1918, amount reverted to Treasury during fiscal year	860.84	
		9,078.69
July 1, 1918, balance unexpended		1,797.67
July 1, 1918, outstanding liabilities		1,797.67
July 1, 1918, balance available		0.00
Amount that can be profitably expended in fiscal year ending June 30, 1920		9,100.00

ITEMIZED STATEMENT OF EXPENDITURES DURING THE FISCAL YEAR ENDING JUNE 30, 1918, SUBMITTED IN COMPLIANCE WITH REQUIREMENT OF SECTION 6 OF RIVER AND HARBOR ACT OF AUGUST 11, 1888.

Observations:		
Pay of permanent gauge observers		$3,548.00
Inspections and repairs:		
Inspection of gauges on Mississippi River by junior engineers and parties on steamers	$1,877.93	
Inspection of gauges on tributaries	109.41	
Renewals and repairs of gauges and bulletins	93.70	
		2,081.04
Office expenses and contingencies:		
Pay of assistant and junior engineers, surveyors, and clerks	1,980.23	
Stationery, printing, office rent, etc	608.58	
		2,588.81
Total		8,217.85

APPROPRIATION FOR FLOOD CONTROL, MISSISSIPPI RIVER, AND SACRAMENTO RIVER, CAL.

July 1, 1917, balance unexpended		$5,660,000.00
Miscellaneous receipts from sales of blue prints, rentals, depreciation of plant, etc		7,885.77
		5,667,885.77
June 30, 1918, amount expended during fiscal year		2,774,299.65
July 1, 1918, balance unexpended		2,893,586.12
July 1, 1918, outstanding liabilities	$469,008.10	
July 1, 1918, amount covered by uncompleted contracts	1,218,735.36	
		1,687,743.46
July 1, 1918, balance available		1,205,842.66

---

[1] The custody and care of the gauges maintained under this appropriation were assumed by the Mississippi River Commission Feb. 11, 1901, on which date they were transferred to the secretary, under authority of Secretary of War, dated Jan. 25, 1901.

[2] The amount, $1,771.69, reported in annual report for 1917, has been increased $4.67 by the secretary, by refundment of overpayment on voucher 107, June, 1917.

Distributed as follows:

Mississippi River Commission	$11,728.02	
Surveys, gauges, and observations	10,256.29	
Levees, Head of the Passes to Rock Island, Ill.	288,803.72	
Revetment and contraction works, permanent channel improvement and protection	321,711.25	
Dredges and dredging	100,753.61	
Plant and miscellaneous	318,901.25	
Improving harbors and tributaries except Memphis Harbor	115,661.84	
Improving Memphis Harbor	38,026.68	
		1,205,842.66

AMOUNT THAT CAN BE PROFITABLY EXPENDED IN FISCAL YEAR ENDING JUNE 30, 1920.

The flood-control act provides "that not more than $10,000,000 shall be expended therefor during any one fiscal year. The full amount can be profitably expended in the fiscal year ending June 30, 1920, exclusive of the balance unexpended July 1, 1919.

CONTRIBUTED FUNDS.

For improvement of Mississippi River in upper St. Francis levee district		$234,000.00
June 30, 1918, expended to end of last fiscal year	$26,734.69	
June 30, 1918, expended during fiscal year	78,919.31	
July 1, 1918, amount covered by uncompleted contracts	128,346.00	
		234,000.00
For improvement of Mississippi River at Norfolk, Miss.		50,000.00
June 30, 1918, expended during fiscal year		50,000.00

FUNDS CONTRIBUTED BY LOCAL LEVEE DISTRICTS FOR FLOOD CONTROL, MISSISSIPPI RIVER, IN ACCORDANCE WITH SUNDRY CIVIL ACT, JUNE 12, 1917.

For levees, Head of Passes to Rock Island, Ill.		$1,373,201.67
June 30, 1918, amount expended during fiscal year		278,264.67
July 1, 1918, balance unexpended		1,094,937.00
July 1, 1918, outstanding liabilities	$76,400.14	
July 1, 1918, amount covered by uncompleted contracts	885,955.48	
		962,355.62
July 1, 1918, balance available		132,581.38

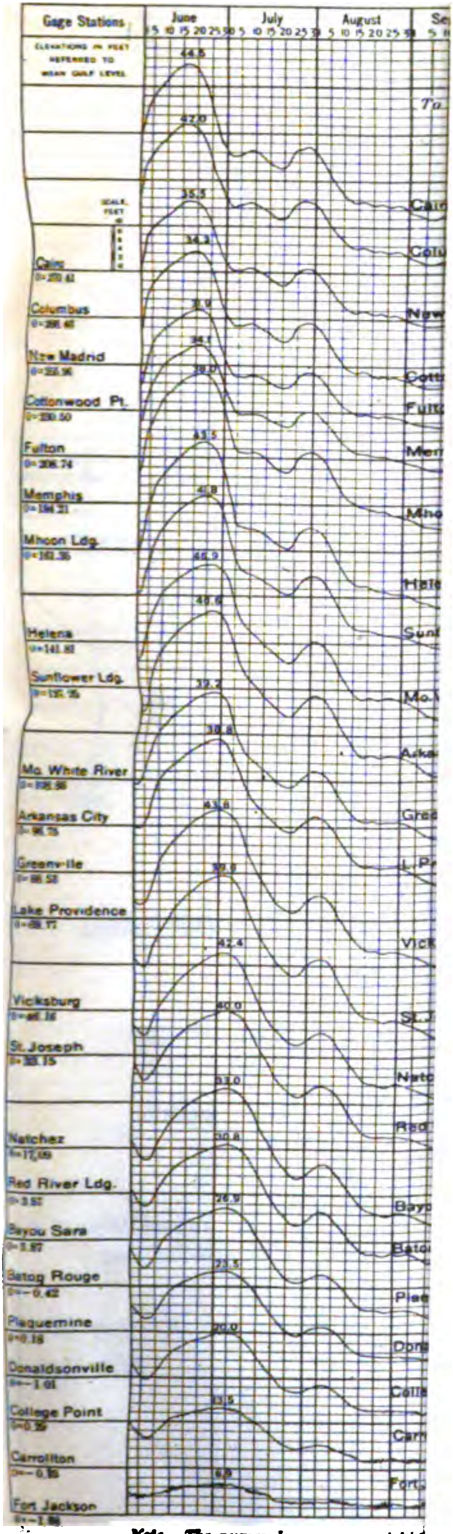
CONSOLIDATED STATEMENT OF ALL APPROPRIATIONS EXPENDED UNDER THE MISSISSIPPI RIVER COMMISSION TO JUNE 30, 1918.

APPROPRIATION FOR MISSISSIPPI RIVER.

Act of June 28, 1879 (organic)	$175,000.00
Act of June 16, 1880 (sundry civil)	150,000.00
Act of Mar. 3, 1881 (river and harbor)	1,000,000.00
Act of Mar. 3, 1881 (sundry civil)	150,000.00
Act of Aug. 2, 1882 (river and harbor)	4,123,000.00
Act of Aug. 7, 1882 (sundry civil)	150,000.00
Act of Mar. 3, 1883 (sndry civil)	150,000.00
Act of Jan. 19, 1884	1,000,000.00
Act of July 5, 1884 (river and harbor)	75,000.00

WAR DEPARTMENT

HYDROGRAPHS OF THE MIS



Note.—The numerals on curves at hig
maximum and minimum gage re

Distributed as follows:

Mississippi River Commission	$11, 728. 02	
Surveys, gauges, and observations	10, 256. 29	
Levees, Head of the Passes to Rock Island, Ill	288, 803. 72	
Revetment and contraction works, permanent channel improvement and protection	321, 711. 25	
Dredges and dredging	100, 753. 61	
Plant and miscellaneous	318, 901. 25	
Improving harbors and tributaries except Memphis Harbor	115, 661. 84	
Improving Memphis Harbor	38, 026. 68	
		1, 205, 842. 66

AMOUNT THAT CAN BE PROFITABLY EXPENDED IN FISCAL YEAR ENDING JUNE 30, 1920.

The flood-control act provides "that not more than $10,000,000 shall be expended therefor during any one fiscal year. The full amount can be profitably expended in the fiscal year ending June 30, 1920, exclusive of the balance unexpended July 1, 1919.

CONTRIBUTED FUNDS.

For improvement of Mississippi River in upper St. Francis levee district		$234, 000. 00
June 30, 1918, expended to end of last fiscal year	$26, 734. 69	
June 30, 1918, expended during fiscal year	78, 919. 31	
July 1, 1918, amount covered by uncompleted contracts	128, 346. 00	
		234, 000. 00
For improvement of Mississippi River at Norfolk, Miss		50, 000. 00
June 30, 1918, expended during fiscal year		50, 000. 00

FUNDS CONTRIBUTED BY LOCAL LEVEE DISTRICTS FOR FLOOD CONTROL, MISSISSIPPI RIVER, IN ACCORDANCE WITH SUNDRY CIVIL ACT, JUNE 12, 1917.

For levees, Head of Passes to Rock Island, Ill		$1, 373, 201. 67
June 30, 1918, amount expended during fiscal year		278, 264. 67
July 1, 1918, balance unexpended		1, 094, 937. 00
July 1, 1918, outstanding liabilities	$76, 400. 14	
July 1, 1918, amount covered by uncompleted contracts	885, 955. 48	
		962, 355. 62
July 1, 1918, balance available		132, 581. 38

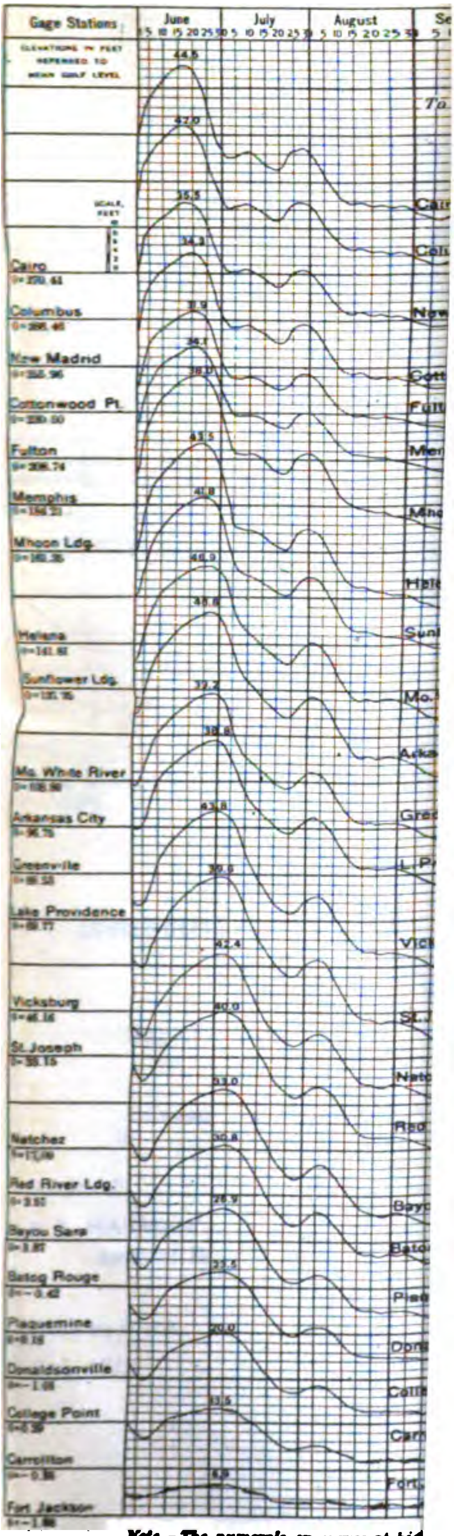
CONSOLIDATED STATEMENT OF ALL APPROPRIATIONS EXPENDED UNDER THE MISSISSIPPI RIVER COMMISSION TO JUNE 30, 1918.

APPROPRIATION FOR MISSISSIPPI RIVER.

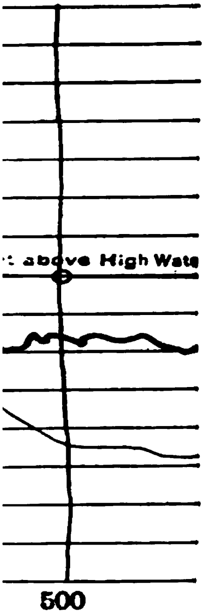
Act of June 28, 1879 (organic)	$175,000. 00
Act of June 16, 1880 (sundry civil)	150, 000. 00
Act of Mar. 3, 1881 (river and harbor)	1, 000, 000. 00
Act of Mar. 3, 1881 (sundry civil)	150, 000. 00
Act of Aug. 2, 1882 (river and harbor)	4, 123, 000. 00
Act of Aug. 7, 1882 (sundry civil)	150, 000. 00
Act of Mar. 3. 1883 (sndry civil)	150, 000. 00
Act of Jan. 19, 1884	1, 000, 000. 00
Act of July 5, 1884 (river and harbor)	75, 000. 00

WAR DEPARTMENT

HYDROGRAPHS OF THE MIS



Note.—The numerals on curves at hig
maximum and minimum gage re



LEVEES BET

RIGHT

0

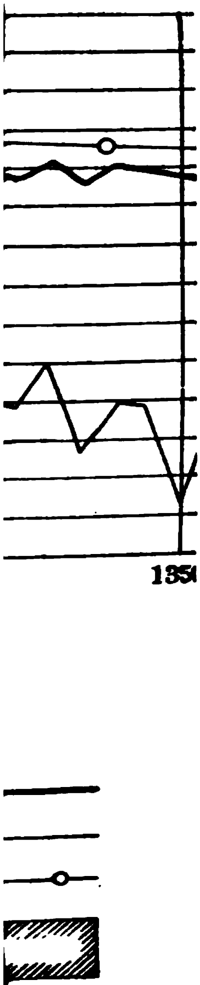
ubmitted:

E. L. HARMAN

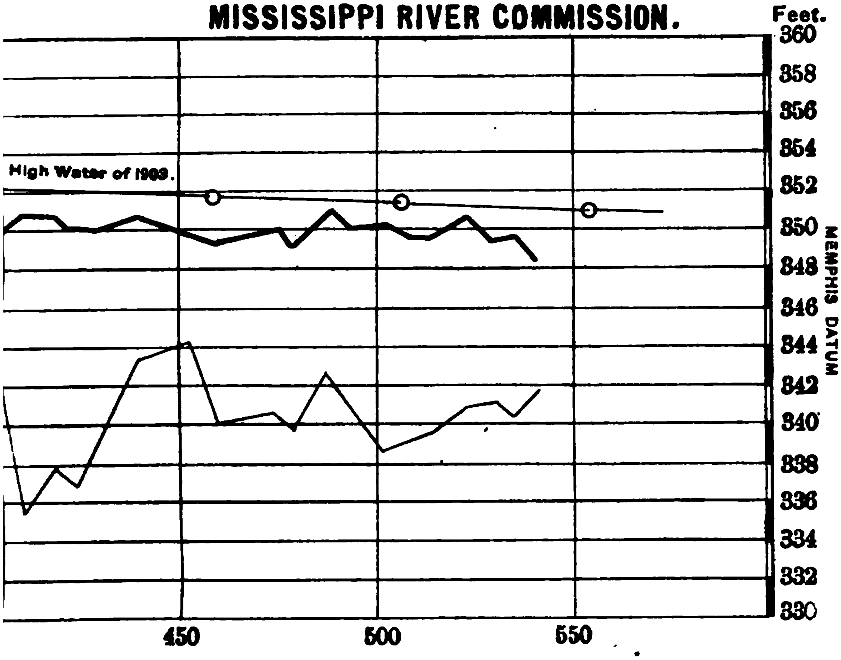
Assistant E

rawn by H.d'A.

June, 1918.


135

MISSISSIPPI RIVER COMMISSION.



:TWEEN CAPE GIRARDEAU, MO. AND ROCK ISLAND, ILL.

\PE GIRARDEAU AND CLEAR CREEK LEVEE

:FT BANK 47 TO 60 MILES ABOVE CAIRO.

HORIZ. SCALE, FEET.
5,000 10,000 15,000

To accompany my Annual Report for 1918:

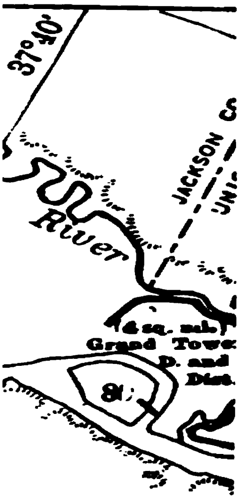
ıgıneer.

E. J. Thomas
Assistant Engineer.
Secretary, Mississippi River Commission.

M.R.C. / 961 *Sheet 10.*

CAPE
ATION
NAL

918.



PE GIRARDEAU,

ION OF LEVI

ALTON TO TH

MILES

5

To acc

G

Act of July 5, 1884 (river and harbor), less $5,000 transferred to snag-boat service		$2,065,000.00
Act of July 7, 1884 (sundry civil)		75,000.00
Act of Aug. 5, 1886 (river and harbor), less $5,942.60 for expenses, Office Chief of Engineers		1,994,057.40
Act of Aug. 5, 1886 (river and harbor), less $47.30 for expenses, Office Chief of Engineers		29,952.70
Act of Aug. 11, 1888 (rivers and harbor), less $4,859 for expenses, Office Chief of Engineers		2,840,141.00
Act of Aug. 11, 1888 (river and harbor)		75,000.00
Act of Oct. 2, 1888 (sundry civil)		35,000.00
Act of Oct. 19, 1888 (deficiency), less $4,214.39 reverted to the Treasury		20,785.61
Act of Sept. 19, 1890 (river and harbor)		3,200,000.00
Act of Sept. 30, 1890 (deficiency)		5,625.00
Act of Mar. 3, 1891 (deficiency)		1,950.00
Joint resolution approved Mar. 3, 1891 (Public, No. 19)		1,000,000.00
Act of July 13, 1892 (river and harbor)		2,470,000.00
Act of July 28, 1892 (deficiency)		44.80
Act of Mar. 3, 1893 (sundry civil)		2,665,000.00
Act of Aug. 18, 1894 (river and harbor)		485,000.00
Act of Aug. 18, 1894 (sundry civil)		2,665,000.00
Act of Mar. 2, 1895 (sundry civil)		2,665,000.00
Act of June 3, 1896 (river and harbor)		909,000.00
Joint resolution approved Mar. 31, 1897 (Public, No. 6)		250,000.00
Act of June 4, 1897 (sundry civil)		2,933,333.00
Act of July 19, 1897 (deficiency)		625,000.00
Act of July 1, 1898 (sundry civil)		1,983,333.00
Act of Mar. 3, 1899 (sundry civil)		2,583,333.00
Act of Mar. 3, 1899 (river and harbor)		185,000.00
Act of June 6, 1900 (sundry civil), less $5,000 for expenses, Office Chief of Engineers		2,245,000.00
Act of June 13, 1902 (river and harbor)		2,200,000.00
Act of Mar. 3, 1903 (sundry civil)		2,000,000.00
Act of Apr. 28, 1904 (sundry civil)		2,000,000.00
Act of Mar. 3, 1905 (river and harbor)		1,000,000.00
Act of Mar. 3, 1905 (sundry civil)		2,000,000.00
Act of June 30, 1906 (sundry civil)		2,000,000.00
Act of Mar. 2, 1907 (river and harbor)		3,000,000.00
Act of May 27, 1908 (sundry civil)		2,000,000.00
Act of Mar. 4, 1909 (sundry civil)		2,000,000.00
Act of June 25, 1910 (sundry civil)		2,000,000.00
Act of June 25, 1910 (river and harbor)		2,000,000.00
Act of Feb. 27, 1911 (river and harbor)		3,000,000.00
Act of July 25, 1912 (river and harbor), less $1,443,944.83 expended for rebuilding levees, under joint resolution of Apr. 30, 1912		4,556,055.17
Act of July 25, 1912 (river and harbor)		30,000.00
Act of Mar. 4, 1913 (river and harbor)		6,000,000.00
Act of Mar. 4, 1913 (river and harbor)		200,000.00
Act of July 27, 1916 (river and harbor)		6,000,000.00
Total specific appropriations		82,965,610.68
Balances from former appropriations applied to works below Cairo under act of Aug. 2, 1882, less $123.42 reverted to Treasury	$272,504.96	
Same for works above Cairo, under act of July 5, 1884	22,632.53	
Total balances		295,137.49
Amount, $15.76, arising from refundments pertaining to extinct or unknown allotments, less debit of Treasury settlement No. 13704, Dec. 26, 1900, as reported by the Chief of Engineers, U. S. Army, June 23, 1916, and credited to allotment for "Mississippi River Commission" December, 1916		14.02

Miscellaneous receipts:	
Previously reported	$160, 210. 35
Amounts received from sales of Engineer property and stores, under the provisions of section 5 of river and harbor act of June 13, 1902, and sales of contact prints—	
By the secretary—	
From sale of coal to Chicago & Eastern Illinois R. R., credited in June, 1918, to allotment for "Dredges and dredging"	271. 19
By first and second districts officer—	
From sales of blue prints, in July, 1917, credited to allotment for "Lower St. Francis levee district"	. 70
From sale of Engineer property in March, 1918, credited to allotment for "Plant"	800. 00
By third district officer—	
From sale of Engineer property, credited to allotment for "Plant" in December, 1917	2, 674. 15
By fourth district officer—	
From sale of Engineer property in July, 1917, credited to allotment for "Plant"	2, 908. 69
Amount received in December, 1917, for rental of steamboat *Nokomis* (ED 114290–3, sec. MRC 2438–11) credited to allotment for "Dredges and dredging," secretary's office	1, 220. 00
Amount received in January, 1918, for rental of steamboats *Nokomis* and *Sachem* (ED 114290–3, sec. MRC 2438–11) credited to allotment for "Dredges and dredging," secretary's office"	2, 260. 00
Amount received in April, 1918, for rental of steamboat *Leota* (sec. MRC 2557–12) credited to allotment for "Dredges and dredging," secretary's office	805. 00
Amount received in May, 1918, for rental of steamboat *Leota* (ED 93650–23, sec. MRC 2557–12) credited to allotment for "Dredges and dredging," secretary's office	910. 00
Amount received in May, 1918, for docking steamer *Eclipse* (ED 78130–29, sec. MRC 2045–29) credited to allotment for "Dredges and dredging," secretary's office	842. 90
Amount received in May, 1918, from collection of stoppage against pay of a United States employee for destruction of public property, credited to allotment for "Dredges and dredging," secretary's office	19. 33
Amount received in June, 1918, for rental of dredge *Delta*, steamboats *Leota* and *Saturn* and pilesinker *No. 983* (ED 104197–2251, sec. MRC 1615–70) credited to allotment for "Dredges and dredging," secretary's office	3, 628. 76
Amount received in June, 1918, for rental of barges, credited to allotment for "Plant," first and second districts	1, 144. 66
Amount received in February, 1918, for use of plant by the Pine Bluff & Rosedale Packet Co. (ED 117483) credited to allotment for "Plant," third district	121. 28
Amount received in February, 1918, for use of plant by the Thane Lumber Co. (ED 117483–2) credited to allotment for "Plant" third district	182. 96

Miscellaneous receipts—Continued.

Amount received in March, 1918, for rental of dock to Vicksburg & Delta Ferry Co. (ED 117483-6) credited to allotment for "Plant" third district	$390.00	
Amount received in March, 1918, for use of towboat credited to allotment for "Plant" third district	134.75	
Amount received in April, 1918, for use of towboat and barges by Board Mississippi Levee Commissioners (ED 117483-9) credited to allotment for "Plant" third district	425.43	
Amount received in May, 1918, for rental of plant by the Royal Route Co. (ED 117483-5) credited to allotment for "Plant" third district	1,890.09	
Amount received in June, 1918, for rental of plant, from New Orleans, La., district, credited to allotment for "Plant" third district	2,923.72	
Amount received in June, 1918, for rental of plant, from Vicksburg, Miss., district, credited to allotment for "Plant" third district	702.59	
Amount received in June, 1918, for rental of plant, from Fourth Mississippi River Commission district, credited to allotment for "Plant" third district	130.00	
Amount received in September, 1917, for rental of steel-carrying barge (ED 74811-55) credited to allotment for "Pontchartrain levee district" fourth district	172.50	
Amount received in February, 1918, for wear and tear of plant account docking tug *Uacha*, credited to allotment for "Plant" fourth district	15.02	
Amount received in March, 1918, from rental of levee machine barge (ED 74811-57) credited to allotment for "Pontchartrain levee district" fourth district	648.33	
Amount received in March, 1918, for wear and tear of plant constructing barges for New Orleans, La., Engineer district, credited to allotment for "Plant" fourth district	1,547.01	
Amount received in May, 1918, for rental of barges (ED 74811-60 and 63) credited to allotment for "Pontchartrain levee district" fourth district	586.04	
Amount received in May, 1918, for rental of barges (ED 74811-59 and 62 and 93650-21) credited to allotment for "Plant" fourth district	186.00	
Amount received in June, 1918, for rental of levee machine barge (ED 93650-24) credited to allotment for "Pontchartrain levee district" fourth district	333.97	
Amount received in June, 1918, for wear and tear of plant in building barge for Panama Canal (ED 91263-376) credited to allotment for "Plant" fourth district	37.90	
Amount received in June, 1918, for wear and tear of plant in building barge for first New Orleans, La., Engineer district (ED 96661-32) credited to allotment for "Plant" fourth district	12.30	
Total miscellaneous receipts		$187,635.62
Total		83,448,397.81

Expended.

Location and object.	To June 30, 1917.	During year ending June 30, 1918.	Total.
Mississippi River Commission	$1,081,751.47	$15,864.41	$1,097,615.88
Surveys, gauges, and observations	3,081,594.67	16,539.20	3,098,133.87
Examination from Cape Girardeau, Mo., to Rock Island, Ill.	10,000.00	....	10,000.00
Levees, Head of the Passes, to Rock Island, Ill	[2] 33,046,682.17	1,235,376.85	34,282,059.02
Revetment and contraction works, permanent channel improvement and protection	[3] 18,395,625.92	779,574.26	19,175,200.18
Dredges and dredging	[4] 6,888,225.64	158,603.86	7,046,829.50
Experimental dikes	100,000.00	....	100,000.00
Plant and miscellaneous	[5] 6,449,981.22	292,152.71	6,742,133.93
Improving harbors and tributaries, except Vicksburg Harbor	9,417,206.37	108,325.51	9,525,531.88
Improving Vicksburg Harbor	[6] 652,903.34	30,077.64	682,980.98
Examination and survey of lands subject to overflow, east bank, Mississippi River	22,401.94	....	22,401.94
Works above Cairo	737,632.53	....	737,632.53
Total expended	79,884,005.27	2,636,514.44	82,520,519.71
To surplus fund	....	....	[7] 7,598.06
Balance unexpended June 30, 1918	....	....	920,280.04
Total	....	....	83,448,397.81

---

[1] The amount, $3,081,595.82, reported in annual report for 1917, has been decreased $1.15 by refundment of overpayment by the secretary on voucher 151, March, 1917 (to surveys, gauges and observations).

[2] The amount, $33,047,693.10, reported in annual report for 1917, has been decreased $1,010.93, by refundments of overpayments and reimbursements, as follows:

By the first and second districts officer—	
August, 1917, cancellation of check No. 2342 (to Reelfoot levee district)	$48.00
November, 1917, reimbursement from appropriation "Pay, etc., of the Army" (to lower St. Francis levee district)	283.10
By the third district officer—	
October, 1917, voucher 194, May, 1917 (to Lower Yazoo levee district)	362.83
December, 1917, voucher 157, June, 1917 (to upper Tensas levee district)	5.00
January, 1918, reimbursement from United States Employees Compensation Commission (to lower Yazoo levee district)	14.00
By the fourth district officer—	
November, 1917, reimbursement from appropriation "Pay, etc., of the Army" (to lower Tensas levee district)	298.00
	1,010.93

[3] The amount, $18,395,990.59, reported in annual report for 1917, has been decreased $364.67 by refundments of overpayments and reimbursements, as follows:

By the first and second districts officer—	
September, 1917, voucher in February, 1917 (to Barfield, Ark.)	$1.00
July, 1917, reimbursement by St. Louis district office for coal furnished snag boats (to Gayoso Bend, Mo.)	270.00
By third district officer—	
July, 1917, voucher 124, February, 1917 (to Red Fork, Ark.)	3.00
August, 1917, voucher 20, January, 1917 (to Cottonwood, Miss.)	.11
November, 1917, reimbursement from Quartermaster General for payment made on voucher 196, June, 1917, for pay and commutation (to Reid-Bedford, La.)	65.56
January, 1918, reimbursement from United States Employees Compensation Commission, for treatment of injured employees (to Red Fork, Ark.)	25.00
	364.67

[4] The amount, $6,889,970.80, reported in annual report for 1917, has been decreased $1,745.16 by refundment of overpayments and reimbursements by the secretary, as follows:

November, 1917, vouchers 1 and 4, March 1917 (to dredges and dredging)	$16.01
July, 1917, reimbursement from St. Louis district office for coal furnished snag boats (to dredge and dredging)	451.28
March, 1918, reimbursement from U. S. Engineer office, Little Rock, Ark., for repairs, etc., to U. S. dredge H. S. Taber (to dredges and dredging)	1,277.87
	1,745.16

[5] The amount, $6,458,187.80, reported in annual report for 1917, has been decreased $8,206.58 by reimbursements, as follows:

By the third district officer—	
January, 1918, reimbursement from United States Employees Compensation Commission, for treatment of injured employees (to plant)	$113.80
By the fourth district officer—	
April, 1918, reimbursement from New Orleans, La., Engineer district, for construction of barges (to plant)	8,092.78
	8,206.58

[6] The amount, $652,940.34, reported in annual report for 1917, has been decreased $37 by reimbursement by the third district officer, as follows:

January, 1918, reimbursement from United States Employees Compensation Commission, for treatment of injured employees (to Vicksburg, Miss.), $37.

[7] Unexpended balance of the specific appropriation by act of July 25, 1912, for examination and survey of lands subject to overflow, east bank, Mississippi River, carried to surplus fund June 30, 1914. (ED 15927–414, sec. MRC 2000–1.)

APPROPRIATION FOR MAINTENANCE AND IMPROVEMENT OF EXISTING RIVER AND HARBOR WORKS.

Act of Oct. 2, 1914 (allotment Oct. 7, 1914)		$3,750,000.00
Act of Mar. 4, 1915 (allotment Apr. 2, 1915)		4,000,000.00
Total specific appropriations		7,750,000.00
Miscellaneous receipts:		
Previously reported	$11,403.18	
Amounts received from sales of Engineer property under provisions of section 5, of river and harbor act of June 13, 1902:		
By first and second districts officer—		
From sale of condemned engineer property, credited in July, 1917, to allotment for "White River levee district" act of Mar. 4, 1915	102.55	
Total miscellaneous receipts		11,505.73
Total		7,761,505.73

Expended.

Location and object.	To June 30, 1917.	During year ending June 30, 1918.	Total.
Mississippi River Commission	$69,751.29		$69,751.29
Surveys, gages, and observations	121,740.09	$2,671.76	124,411.85
Levees, Head of the Passes to Cape Girardeau, Mo.	[1] 3,106,128.12	221,808.82	3,327,936.94
Revetment and contraction works, permanent channel improvement and protection	[2] 2,157,214.71	28,136.60	2,185,351.31
Dredges and dredging	[3] 605,662.06		605,662.06
Experimental revetment	32,670.73	30.66	32,701.39
Plant and miscellaneous	556,109.57	15,000.00	571,109.57
Improving harbors and tributaries, except Vicksburg Harbor.	321,671.89	25,000.00	346,671.89
Total expended	6,970,948.46	292,647.84	7,263,596.30
Balance unexpended June 30, 1918			497,909.43
Total appropriated, etc			7,761,505.73

---

[1] The amount, $3,107,307.48, reported in annual report for 1917, has been decreased $1,179.36 by refundment of overpayment and reimbursements by the first and second district officer, as follows:

September, 1917, voucher in February, 1917 (to lower St. Francis Levee district)	$0.96
July, 1917, reimbursement from Little River drainage district for expenditures in that district (to upper St. Francis Levee district)	995.34
November, 1917, reimbursement from appropriation "Pay, etc., of the Army," for expenditures pertaining to that appropriation	183.06
	1,179.36

[2] The amount, $2,157,229.71, reported in annual report for 1917, has been decreased $15 by the first and second districts officer account appropriation reimbursement in December, 1917, for expenditure in March, 1917, on work at Star Landing, Miss. (to general repairs and stone).

[3] The amount, $605,662.15, reported in annual report for 1917, has been decreased $0.09 by refundment of overpayment by the secretary, November, 1917, voucher 86, January, 1917 (to dredges and dredging).

Appropriation for gauging waters of the Mississippi River and its tributaries.

Allotments from general appropriations for examinations, surveys, and contingencies of rivers and harbors by acts of—	
Mar. 3, 1871 (allotment Apr. 11, 1871)	$5,000.00
June 10, 1872 (allotment July 11, 1872)	5,000.00
Mar. 3, 1873 (allotment May 17, 1873)	5,000.00
June 23, 1874 (allotment July 29, 1874)	5,000.00
Mar. 3, 1875 (allotment Mar. 22, 1875)	5,000.00
Specific appropriations by river and harbor acts of—	
Aug. 14, 1876	5,000.00
June 18, 1878	5,000.00
Mar. 3, 1879	5,000.00
June 14, 1880	5,000.00
Mar. 3, 1881	5,000.00
Aug. 2, 1882	5,000.00

Deficiency act of Mar. 12, 1884	$2,100.00
Specific appropriations by river and harbor acts of—	
July 5, 1884	5,000.00
Aug. 5, 1886	5,000.00
Allotted from specific appropriation by river and harbor act of Aug. 11, 1888 (allotment Oct. 17, 1888)	8,700.00
Deficiency act of Oct. 19, 1888	3,600.00
Allotments from permanent indefinite appropriation made by section 6 of river and harbor act of Aug. 11, 1888, for fiscal years, viz:	
1890 (allotment Aug. 23, 1889)	9,000.00
1891 (allotment Aug. 19, 1890, $8,700, less $3,518.34 withheld in United States Treasury under ruling that only $6,000 can be expended each fiscal year)	5,181.66
1892 (allotment July 17, 1891)	5,100.00
1893 (allotment July 15, 1892)	5,500.00
1894 (allotment July 18, 1893)	5,500.00
1895 (allotment June 5, 1894)	5,500.00
1896 (allotment June 4, 1895)	5,500.00
1897 (allotment May 13, 1896)	5,500.00
1898 (allotment June 16, 1897)	5,500.00
1899 (allotments May 27, 1898, $5,500, July 12, 1898, $500)	6,000.00
1900 (allotment June 1, 1899)	5,500.00
1901 (allotment July 2, 1900)	6,000.00
1902 (allotment July 31, 1901)	6,000.00
Allotments from permanent annual appropriation made by section 6 of river and harbor act of Aug. 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902, for fiscal years, viz:	
1903 (allotment July 23, 1902, $9,600, less $500 allotted Aug. 2, 1902, to St. Paul, Minn., district)	9,100.00
1904 (allotment Apr. 18, 1903)	9,100.00
1905 (allotment Aug. 11, 1904)	9,100.00
1906 (allotment June 30, 1905)	9,100.00
1907 (allotment July 2, 1906)	9,100.00
1908 (allotment July 24, 1907)	9,100.00
1909 (allotment July 3, 1908)	9,100.00
1910 (allotment July 13, 1909)	9,100.00
1911 (allotment July 27, 1910)	9,600.00
1912 (allotment Feb. 7, 1911)	9,100.00
1913 (allotment May 29, 1912)	9,100.00
1914	9,100.00
1915 (allotment Sept. 2, 1914)	9,100.00
1916 (allotment July 28, 1915)	9,100.00
1917 (allotment Aug. 3, 1916)	9,100.00
1918 (allotment June 27, 1917)	9,100.00
Total	301,281.66

Expended.

	To June 30, 1917.	During year ending June 30, 1918.	Total.
Expenditures	[1] $272,306.36	$8,217.85	$280,524.21
Unexpended balances reverted to Treasury	18,098.94	860.84	18,959.78
Total	290,405.30	9,078.69	299,483.99
Unexpended balance June 30, 1918			1,797.67
Total appropriated, etc			301,281.66

[1] The amount, $272,312.08, reported in annual report for 1917 has been decreased $5.72 by refundment for overpayment by the secretary and to correct clerical error, as follows:

July, 1917, voucher 107, June, 1917	$4.67
To correct clerical error	1.05
	5.72

APPROPRIATION FOR FLOOD CONTROL, MISSISSIPPI RIVER, AND SACRAMENTO RIVER, CAL.

Allotment, June 20, 1917, from appropriation by sundry civil act of June 12, 1917		$5,660,000.00
Miscellaneous receipts:		
Amount received from sale of contact prints—		
By fourth district officer—		
From sale of contact prints in May, 1918, credited to allotments indicated—		
"Surveys"	$10.25	
"Lower Tensas levee district"	2.00	
"Barataria levee district"	1.25	
"Pontchartrain levee district"	2.00	
"Plant"	1.25	
"Atchafalaya and Red River, La."	2.00	
Amount received in May, 1918, from rental of barges, credited to allotment for "Plant," first and second districts	1,141.39	
Amount received in June, 1918, from rental of plant, credited to allotment for "Plant," first and second districts	1,485.00	
Amount received in March, 1918, from New Orleans, La., engineer district, for wear and tear of plant, constructing barges, credited to allotment for "Plant," fourth district	883.83	
Amount received in June, 1918, from first New Orleans, La., engineer district for wear and tear of plant, contructing barges (ED 99661-32-33-34), credited to allotment for "Plant," fourth district	3,851.55	
Amount received in June, 1918, from Panama Canal, for wear and tear of plant, constructing barges, (ED 91263-376), credited to allotment for "Plant," fourth district	505.25	
Total miscellaneous receipts		7,885.77
Total		5,667,885.77

Expended.

Location and object.	To June 30, 1917.	During year ending June 30, 1918.	Total.
Mississippi River Commission		$35,622.13	$35,622.13
Surveys, gauges, and observations		39,247.16	39,247.16
Levees, Head of Passes to Rock Island, Ill		943,587.94	943,587.94
Revetment and contraction works, permanent channel improvement and protection		1,139,805.39	1,139,805.39
Dredges and dredging		152,481.92	152,481.92
Plant and miscellaneous		238,536.38	238,536.38
Improving harbors and tributaries, except Memphis Harbor		36,762.01	36,762.01
Memphis Harbor		188,256.72	188,256.72
Total expended		2,774,299.65	2,774,299.65
Balance unexpended June 30, 1918			2,893,586.12
Total appropriated, etc			5,667,885.77

APPROPRIATION FOR REBUILDING LEVEES OF THE MISSISSIPPI RIVER AND TRIBUTARIES DAMAGED BY FLOODS.

Joint resolution of Apr. 30, 1912		$1,500,000.00
Allotments—		
Surveys, Ohio and Mississippi Rivers (allotment May 8, 1912)	$1,000.00	
Cairo drainage district (allotment May 21, 1912)	45,000.00	

Allotments—Continued.		
Upper St. Francis levee district (allotments May 21, 1912, $65,000, and June 18, 1912, $15,000)	$80,000.00	
Reelfoot levee district (allotment May 21, 1912)	60,000.00	
Lower St. Francis levee district (allotments May 21, 1912, $200,000, June 18, 1912, $60,000)	260,000.00	
White River levee district (allotment May 21, 1912)	175,000.00	
Lower Yazoo levee district (allotment May 21, 1912)	173,000.00	
Upper Tensas levee district (allotment May 21, 1912)	269,000.00	
Red River levees (allotment May 21, 1912)	10,000.00	
Atchafalaya levee district (allotment May 21, 1912)	150,000.00	
Lafourche levee district (allotment May 21, 1912)	100,000.00	
Lake Borgne levee district (allotment May 21, 1912)	10,000.00	
East bank Mississippi River from Vicksburg to Bayou Sara, previously reported as allotments to Gum Ridge drainage district, Miss., Fort Adams to Tunica, La., and Bayou Sara, La. (approved May 21, 1912)	50,000.00	
Lower Tensas levee district, Palmyra (allotment June 18, 1912)	11,000.00	
Lower Tensas levee district, Bougere (allotment June 18, 1912)	9,000.00	
Bayou des Glaises, Atchafalaya, Red River, etc. (allotment June 18, 1912)	30,000.00	
Lower Yazoo levee district (allotment July 22, 1912)	37,000.00	
Upper Tensas levee district (allotment July 22, 1912)	30,000.00	
	1,500,000.00	
Miscellaneous receipts, previously reported		$1,169.
		1,501,169.

Expended.

	To June 30, 1917.	During year ending June 30, 1918.	Total.
Expenditures	$1,445,114.49		$1,445,11
Unexpended balance, carried to surplus fund June 30, 1914			56,05
Total appropriated, etc			1,501,16

APPROPRIATION FOR IMPROVING YAZOO RIVER AND TRIBUTARIES, MISS.[1]

Act of July 13, 1892	$75,000
Act of Aug. 18, 1894	225,000
Act of Aug. 18, 1894	40,000
Act of June 4, 1897	350,000
Act of Mar. 3, 1901	510,000
Act of Mar. 3, 1909 (allotment Mar. 29, 1909)	44,000
Act of June 25, 1910	4,000
Act of July 25, 1912	5,000
Act of Mar. 4, 1913	10,000
	1,263,000
Miscellaneous receipts, previously reported	
Total	1,263,000

---

[1] Funds under this appropriation were transferred to the control of the district engi officer, Vicksburg, Miss., district, Oct. 9, 1916, under provision of river and harbor July 27, 1916.

Expended.

	To June 30, 1917.	During year ending June 30, 1918.	Total.
Expenditures	$1,248,277.78		$1,248,277.78
Unexpended balance			[1] 14,722.52
Total appropriated, etc			1,263,000.30

---

[1] Funds under this appropriation were transferred to the control of the district engineer officer, Vicksburg, Miss., district, Oct. 9, 1916, under provision of river and harbor act July 27, 1916.

APPROPRIATION FOR MAINTAINING AND PROTECTING LEVEES OF MISSISSIPPI RIVER AND TRIBUTARIES AGAINST FLOODS.

Act of Apr. 3, 1912	$350,000.00
Act of Apr. 16, 1912	300,000.00
Total specific appropriations	650,000.00
Miscellaneous receipts previously reported	490.80
Total	650,490.80
Expended to June 30, 1914	454,124.11
Amount carried to surplus fund June 30, 1913	195,850.59
Unexpended balance carried to surplus fund June 30, 1914	516.10
Total	650,490.80

APPROPRIATION FOR EXAMINATIONS, SURVEYS, AND CONTINGENCIES OF RIVERS AND HARBORS.

Allotments from appropriation by river and harbor act of Mar. 3, 1905:		
For Ashport, Tenn. (allotments Mar. 29, 1905, $25, and May 8, 1905, $460)		$485.00
Allotment from appropriation by river and harbor act of Mar. 4, 1913:		
For canal leading from Centennial Lake at Vicksburg, Miss., to the Mississippi River		2,000.00
		2,485.00
Expended during fiscal year 1906	$485.00	
Expended during fiscal year 1914	2,000.00	
		2,485.00

APPROPRIATION FOR REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION—INDEFINITE.

Allotment for removing wreck of barkentine *Rachel Emery*		$1,500.00
Expended in fiscal year 1913		1,500.00
Allotment for removing wreck of bark *Santos Amarol*		8,000.00
June 30, 1916, expended in fiscal year	$6.11	
Expended during fiscal year 1917	7,993.89	
		8,000.00

APPROPRIATION FOR REPAIRING GOVERNMENT LEVEE AT WALNUT BEND, ARK.[1]

Act of June 13, 1902 (river and harbor)	$90,000.00
Expended to June 30, 1906	90,000.00

APPROPRIATION FOR WATERWAY FROM LOCKPORT, ILL., TO ST. LOUIS, MO.

Act of June 13, 1902 (river and harbor)		$25,000.00
Amount transferred from allotment for "Survey of Illinois and Des Plaines Rivers, Ill.," as reimbursement		1,093.40
Total		26,093.40
Expended to June 30, 1906	$22,291.23	
Unexpended balance carried to surplus fund on June 30, 1909, under the provisions of section 10 of sundry civil act of Mar. 4, 1909	3,802.17	
		26,093.40

---

[1] Prior to June 30, 1906, was reported under appropriation for "Mississippi River."

APPROPRIATION FOR EMERGENCIES IN RIVER AND HARBOR WORKS.

Allotments from appropriation by act of Apr. 28, 1904:	
For Wolf River (allotment July 6, 1904)	$8,000.00
For Giles Bend, Miss. (allotment July 6, 1904)	40,000.00
	48,000.00
Expended in fiscal year 1905	48,000.00
Allotments from appropriation by act of Mar. 3, 1905:	
For Old River (allotments Oct. 5, 1908, $6,000 and Nov. 12, 1908, $4,000	10,000.00
Expended in fiscal year 1909	10,000.00

APPROPRIATION FOR CLAIMS FOR DAMAGES BY COLLISION, RIVER AND HARBOR WORKS.

Act of Apr. 6, 1914 (urgent deficiency)	73.84
Expended in fiscal year 1914	73.84
Act of Sept. 8, 1916 (general deficiency)	475.28
Expended in fiscal year 1917	475.28

CONTRIBUTED FUNDS.

For improvement of Mississippi River at Trotters Point, Miss		$100,000.00
June 30, 1914, expended in fiscal year		100,000.00
For improvement of Mississippi River near Memphis, Tenn		1,800.00
June 30, 1914, expended in fiscal year	$1,066.61	
Unexpended balance refunded to contributor	733.39	
		1,800.00
For improvement of Mississippi River at Star Landing Bend, Miss		210,000.00
June 30, 1914, expended in fiscal year	$35,009.30	
June 30, 1915, expended in fiscal year	174,990.70	
		210,000.00
For improvement of Mississippi River near Laconia Circle, Ark		8,000.00
June 30, 1915, expended in fiscal year		8,000.00
For improvement of Mississippi River at Delta, Miss		160,000.00
June 30, 1915, expended in fiscal year	$24,871.79	
June 30, 1916, expended in fiscal year	135,128.21	
		160,000.00
For improvement of Mississippi River in Upper St. Francis levee district		234,000.00
June 30, 1917, expended in fiscal year	$26,734.69	
June 30, 1918, expended in fiscal year	78,919.31	
July 1, 1918, amount covered by existing contracts	128,346.00	
		234,000.00
For improvement of Mississippi River at Gayoso Bend, Mo		150,000.00
June 30, 1917, expended in fiscal year		150,000.00
For improvement of Mississippi River in the Reelfoot levee district (Kentucky)		25,000.00
June 30, 1917, expended in fiscal year		25,000.00
For improvement of Mississippi River at Norfolk, Miss		50,000.00
June 30, 1918, expended in fiscal year		50,000.00
For improvement of Mississippi River at Avondale, La		45,000.00
June 30, 1914, expended in fiscal year	$32,467.28	
Unexpended balance refunded to contributor	12,532.72	
		45,000.00
For improvement of Mississippi River at Torras, La		3,000.00
June 30, 1914, expended in fiscal year	$2,453.74	
Unexpended balance refunded to contributor	546.26	
		3,000.00

FUNDS CONTRIBUTED BY LOCAL LEVEE DISTRICTS FOR FLOOD CONTROL, MISSISSIPPI RIVER, IN ACCORDANCE WITH SUNDRY CIVIL ACT, JUNE 12, 1917.

Contributed for flood control, Mississippi River, in fiscal year ending June 30, 1918........ $1,373,201.67

Recapitulation of appropriations, expenditures, etc., under direction of the Mississippi River Commission to June 30, 1918.

Appropriation for—	Expended during fiscal year ending June 30, 1918.	Expended to June 30, 1918.	Deductions.	Balance unexpended June 30, 1918.	Total appropriated, etc.
SPECIFIC APPROPRIATIONS.					
Mississippi River	$2,636,514.44	$82,520,519.71	[1] $7,598.06	$920,280.04	$83,448,397.81
Maintenance and improvement of existing river and harbor works	292,647.84	7,263,596.30	....	497,909.43	7,761,505.73
Flood Control, Mississippi River, and Sacramento River, Cal	2,774,299.65	2,774,299.65	....	2,893,586.12	5,667,885.77
Rebuilding levees of the Mississippi River and its tributaries damaged by floods	....	1,445,114.49	[1] 56,055.17	....	1,501,169.66
Maintaining and protecting Mississippi River and tributaries against floods	....	454,124.11	[1] 196,366.69	....	650,490.80
Examinations, surveys, and contingencies of rivers and harbors	....	2,485.00	....	....	2,485.00
Repairing Government levee, Walnut Bend, Ark	....	90,000.00	....	....	90,000.00
Waterway from Lockport, Ill., to St. Louis, Mo	....	22,291.23	[1] 3,802.17	....	26,093.40
Emergencies in river and harbor works	....	58,000.00	....	....	58,000.00
Total	5,703,461.93	94,630,430.49	[1] 263,822.09	4,311,775.59	[2] 99,206,028.17
CONTRIBUTED FUNDS.					
Contributed funds, improvement Mississippi River	128,919.31	844,641.63	[3] 13,812.37	128,346.00	986,800.00
Contributed funds, flood-control act	278,264.67	278,264.67	....	1,094,937.00	1,373,201.67
	407,183.98	1,122,906.30	[3] 13,812.37	1,223,283.00	[4] 2,360,001.67
Total of specific appropriations and contributed funds	6,110,645.91	95,753,336.76	277,634.46	5,535,058.59	[5] 101,566,029.84
PERMANENT APPROPRIATIONS, ETC.					
Gauging waters of the Mississippi River and its tributaries [6]	8,217.85	140,716.44	[7] 12,018.93	1,797.67	154,533.04
Improving Yazoo River and tributaries	....	[8] 4,442.29	[9] 14,722.52	....	19,164.81
Removing sunken vessels or craft obstructing or endangering navigation, indefinite	....	9,500.00	....	....	9,500.00
Claims for damages by collision, river and harbor works	....	549.12	....	....	549.12
Total	8,217.85	155,207.85	26,741.45	1,797.67	183,746.97

---

[1] Carried to surplus fund.

[2] To reduce to net appropriations as shown on line 6 of the financial summary, deduct $470,849.21 account receipts from sales and amounts carried to surplus fund.

[3] Returned to contributors.

[4] To reduce to net contribution as shown on line 6 of the financial summary, deduct $13,812.37 account amount returned to contributors.

[5] See notes [2] and [4].

[6] Since February 11, 1901.

[7] Unexpended balance reverted to Treasury.

[8] Since Mar. 4, 1913.

[9] Transferred to control of District Engineer Officer, Vicksburg (Miss.) District, Oct. 9, 1916, under provisions of river and harbor act July 27, 1916. (E D 7715–38.)

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918.

SECRETARY, MISSISSIPPI RIVER COMMISSION.

[Appropriations: Mississippi River; flood control, Mississippi River and Sacramento River, Cal.; funds contributed for flood control, Mississippi River; maintenance and improvement of existing river and harbor works; gauging waters of the Mississippi River and its tributaries; increase of compensation, rivers and harbors, 1918; waterway from Lockport, Ill., to St. Louis, Mo.; for claims for damages by collision, river and harbor works.]

	Appropriation for Mississippi River, allotment for—				
	Mississippi River Commission.	Surveys, gauges, and observations.	Dredges and dredging.	Levees, Rock Island to New Boston, Ill.	Levees, Muscatine to mouth of Iowa River, Iowa.
Amount expended on previous projects	$238,110.74	$855,247.37	....	....	....
Amount expended on present project to end of last fiscal year	843,640.73	1,746,323.95	$6,497,621.53	$275.12	$373.18
Balance unexpended at end of last fiscal year.	16,657.59	15,265.59	184,937.38	14,724.88	29,626.82
Receipts from sales, etc., this fiscal year:					
By transfer from allotment for levees, La Grange to mouth of Missouri River, Mo., act of Mar. 4, 1913[2]	....	....	....	2,146.28	....
By transfer from allotment for levees, head of Chouteau Island to Prairie du Pont, Ill., act of July 27, 1916[3]	....	....	....	....	5,500.00
Proceeds from rental of steamboats Nokomis and Sachem[4]	....	....	3,480.00	....	....
Proceeds from rental of steamboat Leota[5].	....	....	1,715.00	....	....
Proceeds from docking Lee Line steamer Eclipse[6]	....	....	842.90	....	....
Collection of stoppage against pay of a United States employee[7]	....	....	19.33	....	....
Reimbursement for coal furnished United States snagboat John N. Macomb[8]	....	....	619.19	....	....
Reimbursement for coal furnished first and second Mississippi River Commission districts[9]	....	....	26,798.04	....	....
Received for rental, etc., of boats[10]	....	....	3,753.81	....	....
Received from sale of coal to Chicago & Eastern Illinois R.R. for steamer Leota[11].	....	....	271.19	....	....
	16,657.59	15,265.59	222,436.84	16,871.16	35,126.82
Amount expended from beginning of present fiscal year to end of previous month	15,864.41	7,080.71	[12]183,111.95	140.14	4,967.55
Amount expended during the month	....	17.50	3,034.19	....	1,930.97
	15,864.41	7,098.21	[13]186,146.14	140.14	6,898.52
Balance unexpended at end of month.	793.18	8,167.38	36,290.70	16,731.02	28,228.30
In Treasury United States	48.99	263.24	36,290.70	10,724.88	22,948.70
In hand	744.19	7,904.14	....	6,006.14	5,279.60
	793.18	8,167.38	36,290.70	16,731.02	28,228.30
Outstanding liabilities at end of month	283.73	102.59	2,467.27	79.50	718.54
Amount covered by existing contracts at end of month	....	7,942.00	....	15,425.00	25,356.66
	283.73	8,044.59	2,467.27	15,504.50	26,075.20
Balance available at end of month	509.35	122.79	[14]33,823.43	1,226.52	2,153.10

---

[1] Experimental dikes, $45,075.58; patrol of the Mississippi River, $1,055.56; spillway surveys, $15,000; levees, Muscatine to Port Louisa, Iowa, $99.91; levees, Grand Tower to near Thebes, Ill., $10,000; examination from Cape Girardeau, Mo., to Rock Island, Ill., $10,000.

[2] By resolution of the Mississippi River Commission, Oct. 30, 1917, approved by Acting Chief of Engineers, Nov. 6, 1917. (ED 89361–69, Sec. MRC 1936–2190.)

[3] By resolution of the Mississippi River Commission, Oct. 30, 1917, approved by Acting Chief of Engineers, Nov. 6, 1917. (ED 89361–72, Sec. MRC 1936–2189.)

[4] Under lease between Lieut. Col. Clarke S. Smith, Corps of Engineers, U. S. Army, and Edward F. Goltra, dated July 30, 1917, approved by Chief of Engineers, Aug. 28, 1917. (ED 114290–3, Sec. MRC 2438–11.)

[5] Under lease between Edward J. Thomas, assistant engineer, special disbursing agent, U. S. Army, and William J. Jackson, receiver, Chicago & Eastern Illinois R. R. Co., dated Mar. 6, 1918. (Sec. MRC 2557–12.)

[6] Docked at West Memphis, Ark. (ED 78130–29, Sec. MRC 2045–29.)

[7] For destruction of public property, deposited to credit of Treasurer of United States, May 31, 1918, certificate of deposit No. 638.

[8] From St. Louis district engineer office. (ED 104197–2151, Sec. MRC 1256–84.)

[9] From first and second Mississippi River Commission district. (ED 104197–2197, Sec. MRC 369–344.)

[10] From first and second Mississippi River Commission district for use of dredge Delta, steamers Leota and Saturn, and pile sinker No. 983. (ED 104197–2251, Sec. MRC 1615–70.)

[11] Deposited to credit of Treasurer of United States, June 29, 1918, certificate of deposit No. 744.

[12] Amount, $183,090.03, previously reported increased $21.92; formerly reported on voucher 149, May, 1918, as expended under allotment for dredges and dredging, appropriation for flood control, Mississippi River and Sacramento River, Cal.

[13] Includes $153.85 reimbursable for coal furnished the first and second Mississippi River Commission districts.

[14] Does not include $153.85, reimbursable for coal furnished the first and second Mississippi River Commission districts.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

	Appropriation for Mississippi River, allotment for—			
	Levees, Oquawka to Dallas, Ill.	Levees, Warsaw to Quincy, Ill.	Levees, La Grange to mouth of Missouri River, Mo.	Levees, Quincy to Hamburg Bay, Ill.
Amount expended on present project to end of last fiscal year	$691.89	$18,150.78	$39,481.78	$24,776.59
Balance unexpended at end of last fiscal year	19,308.11	31,849.22	20,418.31	105,223.41
Receipts from sales, etc., this fiscal year:				
By transfer from allotment for levees, head of Chouteau Island to Prairie du Pont, Ill., act of July 27, 1916[1]	....	5,600.00	....	....
	19,308.11	37,449.22	20,418.31	105,223.41
By transfer to allotment for levees, Rock Island to New Boston, Ill., act of Mar. 4, 1913[2]	....	....	2,146.28	....
Amount expended from beginning of present fiscal year to end of previous month	215.51	34,146.25	18,257.76	25,290.23
Amount expended during the month	....	61.35	....	124.19
	215.51	34,207.60	20,404.04	25,414.42
Balance unexpended at end of month	19,092.60	3,241.62	14.27	79,808.99
In Treasury United States	18,308.11	200.00	....	79,223.41
In hand	784.49	3,041.62	14.27	585.58
	19,092.60	3,241.62	14.27	79,808.99
Outstanding liabilities at end of month	....	118.25	....	....
Amount covered by existing contracts at end of month	....	....	....	4,422.03
	....	118.25	....	4,422.03
Balance available at end of month	19,092.60	3,123.37	14.27	75,386.96

---

[1] By resolution of the Mississippi River Commission, Oct. 30, 1017, approved by Acting Chief of Engineers, Nov. 6, 1917. (ED 89361-72, Sec. MRC 1936-2190.)

[2] By resolution of the Mississippi River Commission, Oct. 30, 1917, approved by Acting Chief of Engineers, Nov. 6, 1917. (ED 89361-69, Sec. MRC 1936-2190.)

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

	Appropriation for Mississippi River, allotment for—			
	Levees, head of Chouteau Island to Prairie du Pont, Ill.	Levees, Grand Tower to Gale, near Thebes, Ill.	Expended allotments.	Total.
Amount expended on previous projects				$1,093,358.11
Amount expended on present project to end of last fiscal year	$60,678.12	$4,163.30	[1]$81,231.05	9,317,406.02
Balance unexpended at end of last fiscal year	24,321.88	15,836.70		478,169.89
Receipts from sales, etc., this fiscal year:				
By transfer from allotment for levees, La Grange to mouth of Missouri River, Mo., act of Mar. 4, 1913[2]				2,146.28
By transfer from allotment for levees, head of Chouteau Island to Prairie du Pont, Ill., act of July 27, 1916[3]				11,100.00
Proceeds from rental of steamboats Nokomis and Sachem[4]				3,480.00
Proceeds from rental of steamboat Leota[5]				1,715.00
Proceeds from docking Lee Line steamer Eclipse[6]				842.90
Collection of stoppage against pay of a United States employee[7]				19.33
Reimbursement for coal furnished United States snagboat John N. Macomb[8]				619.19
Reimbursement for coal furnished first and second Mississippi River Commission districts[9]				26,798.04
Received for rental, etc., of boats[10]				3,753.81
Received from sale of coal to Chicago & Eastern Illinois R. R. for steamer Leota[11]				271.19
	24,321.88	15,836.70		528,915.63
By transfer to allotment for levees, Rock Island to New Boston, Ill., act of Mar. 4, 1913[2]				2,146.28
By transfer to allotments for levees, Muscatine to mouth of Iowa River, Iowa, and Warsaw to Quincy, Ill., act of July 27, 1916[3]	11,100.00			11,100.00
Amount expended from beginning of present fiscal year to end of previous mouth	13,221.88	10,318.29		312,614.68
Amount expended during the month		421.60		5,589.80
	24,321.88	10,739.89		331,450.76
Balance unexpended at end of month		5,096.81		197,464.87
In Treasury United States		36.70		168,044.73
In hand		5,060.11		29,420.14
		5,096.81		197,464.87
Outstanding liabilities at end of month		287.10		4,056.98
Amount covered by existing contracts at end of month		4,179.75		57,325.44
		4,466.85		61,382.42
Balance available at end of month		629.96		136,082.45

---

[1] Experimental dikes, $45,075.58; patrol of the Mississippi River, $1,055.56; spillway surveys, $15,000; levees, Muscatine to Port Louisa, Iowa, $99.91; levees, Grand Tower to near Thebes, Ill., $10,000; examination from Cape Girardeau, Mo., to Rock Island, Ill., $10,000.

[2] By resolution of the Mississippi River Commission, Oct. 30, 1917, approved by Acting Chief of Engineers, Nov. 6, 1917. (ED 89361-69, Sec. MRC 1936-2190.)

[3] By resolution of the Mississippi River Commission, Oct. 30, 1917, approved by Acting Chief of Engineers, Nov. 6, 1917. (ED 89361-72, Sec. MRC 1936-2189.)

[4] Under lease between Lieut. Col. Clarke S. Smith, Corps of Engineers, U. S. Army, and Edward F. Goltra, dated July 30, 1917, approved by Chief of Engineers, Aug. 28, 1917. (ED 114290-3, Sec. MRC 2438-11.)

[5] Under lease between Edward J. Thomas, assistant engineer, special disbursing agent, U. S. Army, and William J. Jackson, receiver, Chicago & Eastern Illinois R. R. Co., dated Mar. 6, 1918. (Sec. MRC 2557-12.)

[6] Docked at West Memphis, Ark. (ED 78130-29, Sec. MRC 2045-29.)

[7] For destruction of public property, deposited to credit of Treasurer of United States, May 31, 1918, certificate of deposit No. 638.

[8] From St. Louis district engineer office. (ED 104197-2151, Sec. MRC 1256-84.)

[9] From first and second Mississippi River Commission district. (ED 104197-2197, Sec. MRC 369-344.)

[10] From first and second Mississippi River Commission district for use of dredge Delta, steamers Leota and Saturn, and pile sinker No. 983. (ED 104197-2251, Sec. MRC 1615-70.)

[11] Deposited to credit of Treasurer of United States, June 29, 1918, certificate of deposit No. 744.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

	Appropriation for flood control, Mississippi River, and Sacramento River, Cal., allotment for—				
	Mississippi River Commission.	Surveys, gauges, and observations.	Dredges and dredging.	New steamer.	Levees, Rock Island to New Boston, Ill.
Amount appropriated or allotted this fiscal year: act of June 12, 1917	$50,000.00	$40,000.00	$350,000.00	$196,000.00	....
Receipts from sales, etc., this fiscal year:					
By transfer from allotment for levees Prairie du Pont to Grand Tower, Ill., act of June 12, 1917 [1]	....	....	....	....	$55,000.00
Reimbursement for preparation of boats and use of marine ways [2]	....	....	382.99	....	....
	50,000.00	40,000.00	350,382.99	196,000.00	55,000.00
Amount expended from beginning of present fiscal year to end of previous month	29,274.19	27,346.92	[3] 136,847.31	....	63.33
Amount expended during the month	6,347.94	2,562.52	16,017.60	....	26.85
	35,622.13	29,909.44	152,864.91	....	90.18
Balance unexpended at end of month	14,377.87	10,090.56	197,518.08	196,000.00	54,909.82
In Treasury United States	16,735.72	−238.58	160,382.99	196,000.00	49,000.00
In hand	−2,357.85	10,329.14	37,135.09	....	5,909.82
	14,377.87	10,090.56	197,518.08	196,000.00	54,909.82
Outstanding liabilities at end of month	2,641.92	2,422.38	96,706.95	....	....
Amount covered by existing contracts at end of month	7.93	3.88	57.52	....	50,766.67
	2,649.85	2,426.26	96,764.47	....	50,766.67
Balance available at end of month	11,728.02	7,664.30	100,753.61	196,000.00	4,143.15

---

[1] Approved by Acting Chief of Engineers, Feb. 9, 1918. (ED 15927-572, Sec. MRC 1936-2401.)

[2] From first and second Mississippi River Commission district for use of marine ways and preparation for rental of dredge Delta and steamer Leota. (ED 104197-2251, Sec. MRC 1615-70.)

[3] Amount, $136,869.23, previously reported decreased $21.92; transferred June, 1918, to expenditure under allotment for dredges and dredging, appropriation for Mississippi River.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

	Appropriation for flood control, Mississippi River, and Sacramento River, Cal., allotment for—			
	Levees, Muscatine to mouth of Iowa River, Iowa.	Levees, Warsaw to Quincy, Ill.	Levees, mouth of Des Moines River to La Grange Mo.	Levees, La Grange to mouth of Missouri River, Mo.
Amount appropriated or allotted this fiscal year, act of June 12, 1917	$30,000.00	$30,000.00	$20,000.00	$70,000.00
Receipts from sales, etc., this fiscal year:				
By transfer from allotment for levees, St. Louis to Cape Girardeau, Mo., act of June 12, 1917[1]		25,000.00		
	30,000.00	55,000.00	20,000.00	70,000.00
Amount expended from beginning of present fiscal year to end of previous month	76.71	28.38	8,365.60	1,177.02
Amount expended during the month	16.91		2,510.90	3,725.73
	93.62	28.38	10,876.50	4,902.75
Balance unexpended at end of month	29,906.38	54,971.62	9,123.50	65,097.25
In Treasury United States	28,992.33	54,000.00	5,608.19	59,886.78
In hand	914.05	971.62	3,515.31	5,210.47
	29,906.38	54,971.62	9,123.50	65,097.25
Outstanding liabilities at end of month	125.65	14.81	10.39	1,751.13
Amount covered by existing contracts at end of month	26,250.00		3,165.80	49,887.11
	26,375.65	14.81	3,176.19	51,638.24
Balance available at end of month	3,530.73	54,956.81	5,947.31	13,459.01

[1] Approved by Chief of Engineers, Feb. 9, 1918. (ED 15927-564, Sec. MRC 1936-2316.)

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—**Continued.**

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

	Appropriation for flood control, Mississippi River, and Sacramento River, Cal., allotment for—			
	Levees, St. Louis to Cape Girardeau, Mo.	Levees, Prairie du Pont to Grand Tower, Ill.	Levees, Grand Tower to Gale near Thebes, Ill.	Total.
Amount appropriated or allotted this fiscal year, act of June 12, 1917	$50,000.00	$55,000.00	$25,000.00	$916,000.00
Receipts from sales, etc., this fiscal year:				
By transfer from allotment for levees, St. Louis to Cape Girardeau, Mo., act of June 12, 1917 [1]			25,000.00	25,000.00
By transfer from allotment for levees, St. Louis to Cape Girardeau, Mo., act of June 12, 1917 [2]				25,000.00
By transfer from allotment for levees, Prairie du Pont to Grand Tower, Ill., act of June 12, 1917 [3]				55,000.00
Reimbursement for preparation of boats and use of marine ways [4]				382.99
	50,000.00	55,000.00	50,000.00	1,021,382.99
By transfer to allotment for levees, Grand Tower to Gale, near Thebes, Ill., act of June 12, 1917 [1]	25,000.00			25,000.00
By transfer to allotment for levees, Warsaw to Quincy, Ill., act of June 12, 1917 [2]	25,000.00			25,000.00
By transfer to allotment for levees, Rock Island to New Boston, Ill., act of June 12, 1917 [3]		55,000.00		55,000.00
Amount expended from beginning of present fiscal year to end of previous month			27.27	203,206.73
Amount expended during the month			1,454.73	32,663.18
	50,000.00	55,000.00	1,482.00	340,869.91
Balance unexpended at end of month			48,518.00	680,513.08
In Treasury United States			43,992.33	614,359.76
In hand			4,525.67	66,153.32
			48,518.00	680,513.08
Outstanding liabilities at end of month			3,931.16	107,604.39
Amount covered by existing contracts at end of month			14,478.93	144,617.84
			18,410.00	252,222.23
Balance available at end of month			30,107.91	428,290.85

---

[1] By resolution of Mississippi River Commission, Oct. 30, 1917, approved by Acting Chief of Engineers Nov. 6, 1917. (ED 15927-553, Sec. MRC 1936-2179.)

[2] Approved by Chief of Engineers, Feb. 9, 1918. (ED 15927-564, Sec. MRC 1936-2316.)

[3] Approved by Acting Chief of Engineers, Feb. 9, 1918. (ED 15927-572, Sec. MRC 1936-2401.)

[4] From first and second Mississippi River Commission district for use of marine ways and preparation for rental of dredge Delta and steamer Leota. (ED 104197-2251, Sec. MRC 1615-70.)

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

	Appropriation for maintenance and improvement of existing river and harbor works, act of Oct. 2, 1914, allotment for—			
	Mississippi River Commission.	Surveys, gauges, and observations.	Dredges and dredging.	Total.
Amount expended on present project to end of last fiscal year	$29,991.18	$59,936.16	$298,435.38	$388,362.72
Balance unexpended at end of last fiscal year	8.82	63.84	1,564.62	1,637.28
	8.82	63.84	1,564.62	1,637.28
By transfer to allotment "Upper St. Francis levee district," first and second Mississippi River Commission districts[1]	8.82	63.84	1,564.62	1,637.28

	Appropriation for maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—			
	Mississippi River Commission.	Surveys, gauges, and observations.	Dredges and dredging.	Total.
Amount expended on present project to end of last fiscal year	$39,760.11	$43,161.53	$307,226.68	$390,148.32
Balance unexpended at end of last fiscal year	239.89	16,839.26	92,773.32	109,852.47
	239.89	16,839.26	92,773.32	109,852.47
By transfer to allotment "Upper St. Francis levee district," first and second Mississippi River Commission districts[1]	239.89	16,839.26	92,773.32	109,852.47

	Appropriation for gauging waters of the Mississippi River and its tributaries.	Works above Cairo. [Appropriation: Improving Mississippi River.]		
		Protection near Cairo.[2]	Des Moines Rapids to Ohio River.	Total.
Amount expended on present project to end of last fiscal year	$272,306.36	$50,000.00	$687,632.53	$737,632.53
Balance unexpended at end of last fiscal year	[3] 915.52	....	....	....
Amount appropriated or allotted this fiscal year	9,100.00	....	....	....
	10,015.52	....	....	....
Amount expended from beginning of present fiscal year to end of previous month	7,496.89	....	....	....
Amount expended during the month	720.96	....	....	....
	8,217.85	....	....	....
Balance unexpended at end of month	1,797.67	....	....	....
In Treasury United States	900.00	....	....	....
In hand	897.67	....	....	....
	1,797.67	....	....	....
Outstanding liabilities at end of month	1,797.67	....	....	....

---

[1] By resolution of the Mississippi River Commission Apr. 6, 1918, approved by Chief of Engineers Apr 15, 1918. (E D 15927-576, Sec. MRC 2051-12.)

[2] Includes only work under act of July 5, 1884.

$860.84 of the unexpended balance for 1917 reverted to Treasury Oct. 1, 1917.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

	Funds contributed for flood control, Mississippi River (special fund).				
	Levees, Rock Island to New Boston, Ill.	Levees, Muscatine to mouth of Iowa River, Iowa.	Levees, Warsaw to Quincy, Ill.	Levees, mouth of Des Moines River to La Grange, Mo.	Levees, La Grange to mouth of Missouri River, Mo.
Amount appropriated or allotted this fiscal year	[1] $27,50000	[2] $15,000.00	[3] $27,500.00	[4] $7,200.00	[5] $33,000.00
Amount expended from beginning of present fiscal year to end of previous month	31.67	38.36	14.20	4,129.33	569.74
Amount expended during the month	13.43	8.45	....	1,255.45	1,862.87
	45.10	46.81	14.20	5,384.78	2,432.61
Balance unexpended at end of month	27,454.90	14,953.19	27,485.80	1,815.22	30,567.39
In Treasury United States	10,000.00	4,000.00	5,000.00	200.00	....
In other depositories	[6] 17,500.00	[7] 10,000.00	[8] 22,500.00	....	[9] 28,000.00
In hand	—45.10	953.19	—14.20	1,615.22	2,567.39
	27,454.90	14,953.19	27,485.80	1,815.22	30,567.39
Outstanding liabilities at end of month	....	64.00	7.39	5.19	878.23
Amount covered by existing contracts at end of month	25,383.33	13,125.00	....	1,582.90	24,943.55
	25,383.33	13,189.00	7.39	1,588.09	25,821.78
Balance available at end of month	2,071.57	1,764.19	27,478.41	227.13	4,745.61

[1] Contributed by the Drury drainage district, Ill.

[2] Contributed by the Muscatine-Louisa Island levee district, Iowa, Mar. 14, 1918. (Sec. MRC 2461-21.)

[3] Contributed by the Hunt drainage district, Ill.

[4] Contributed by the Gregory drainage district, Mo., $6,500 on Oct. 14, 1917 (Sec. MRC 2461-21), and $700 on Apr. 18, 1918 (Sec. MRC 1936-2529).

[5] Contributed by the Riverland levee district, Mo., Dec. 8, 1917 (Sec. MRC 2461-21).

[6] On deposit with Hershey State Bank, Muscatine, Iowa, to credit of president, Mississippi River Commission.

[7] On deposit with First National Bank, Muscatine, Iowa, to credit of president, Mississippi River Commission.

[8] On deposit with Hill Dodge Bank, Warsaw, Ill., to credit of president, Mississippi River Commission.

[9] On deposit with Ayers National Bank, Jacksonville, Ill., to credit of president, Mississippi River Commission.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

	Funds contributed for flood control, Mississippi River (special fund).		Expended appropriations.	Increase of compensation. rivers and harbors. 1918.	Grand total.
	Levees, Grand Tower to Gale near Thebes, Ill.	Total.			
Amount expended on previous projects					$1,093,358.11
Amount expended on present project to end of last fiscal year			[1] $22,777.37		11,128,635.32
Balance unexpended at end of last fiscal year					590,575.16
Amount appropriated or allotted this fiscal year	[2] $25,000.00	$135,200.00		[3] $6,100.00	1,066,400.00
Receipts from sales, etc., this fiscal year:					
By transfer from allotment for levees, La Grange to mouth of Missouri River, Mo					2,146.28
By transfer from allotment for levees, head of Chouteau Island to Prairie du Pont, Ill					11,100.00
Proceeds from rental of steamers Nokomis and Sachem					3,480.00
Proceeds from rental of steamboat Leota					1,715.00
Proceeds from docking steamer Eclipse					842.90
Collection of stoppage of pay of a United States employee					19.33
Reimbursement for coal furnished United States snag boat John N. Macomb					619.19
Reimbursement for coal furnished first and second Mississippi River Commission districts					26,798.04
Received for rental, etc., of boats to first and second Mississippi River Commission districts					3,753.81
By transfer from allotment for levees, St. Louis to Cape Girardeau, Mo					25,000.00
Do					25,000.00
By transfer from allotment for levees, Prairie du Pont to Grand Tower, Ill					55,000.00
Reimbursement for use of marine ways. etc					382.99
Received from sale of coal to Chicago & Eastern Illinois R. R					271.19
Reimbursement for rental of steamboat, etc., to first and second Mississippi River Commission districts [4]				13.90	13.90
	25,000.00	135,200.00		6,113.90	1,813,117.79
By transfer to allotment for levees, Rock Island to New Boston, Ill					2,146.28
By transfer to allotments for levees, Muscatine to mouth of Iowa River, Iowa. and Warsaw to Quincy, Ill					11,100.00
By transfer to allotment for levees, Grand Tower to Gale near Thebes, Ill					25,000.00
By transfer to allotment for levees, Warsaw to Quincy Ill					25,000.00
By transfer to allotment for levees. Rock Island to New Boston, Ill					55,000.00

---

[1] Waterway from Lockport, Ill., to St. Louis, Mo., $22,291.23 (unexpended balance, $3,802.17, of this appropriation carried to surplus fund June 30, 1909, under provisions of section 10 of sundry civil act of Mar. 4, 1909—(ED 46863-142, Sec. MRC 1125-9); claims for damages by collision, river and harbor works, $486.14.

[2] Contributed by the East Cape Girardeau and Clear Creek drainage district, Ill., Feb. 4, 1918 (Sec. MRC 2461-21).

[3] Amount, $5,100, previously reported increased $1,000 in June, 1918.

[4] From first and second Mississippi River Commission district. (ED 104197-2251, Sec. MRC 1615-70.)

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

	Funds contributed for flood control, Mississippi River (special fund).		Expended appropriations.	Increase of compensation, rivers and harbors, 1918.	Grand total.
	Levees, Grand Tower to Gale near Thebes, Ill.	Total.			
Receipts from sales, etc., this fiscal year—Continued.					
By transfer to allotment "Upper St. Francis levee district" first and second Mississippi River Commission districts	....	....	....	....	$111,489.75
Amount expended from beginning of present fiscal year to end of previous month	$13.63	$4,796.93	....	$4,986.61	533,101.84
Amount expended during the month	727.37	3,867.57	....	404.49	43,246.00
	741.00	8,664.50	....	5,391.10	806,083.87
Balance unexpended at end of month	24,259.00	126,535.50	....	722.80	1,007,033.92
In Treasury United States	5,000.00	24,200.00	....	13.90	807,518.39
In other depositories	[1] 15,000.00	93,000.00	....	....	93,000.00
In hand	4,259.00	9,335.50	....	708.90	106,515.53
	24,259.00	126,535.50	....	722.80	1,007,033.92
Outstanding liabilities at end of month	1,965.58	2,920.39	....	87.46	116,466.89
Amount covered by existing contracts at end of month	7,234.45	72,269.23	....	....	274,212.51
	9,200.03	75,189.62	....	87.46	390,679.40
Balance available at end of month	15,058.97	51,345.88	....	635.34	616,354.52

---

[1] On deposit with Alexander County National Bank, Cairo, Ill., to credit of president, Mississippi River Commission.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FIRST AND SECOND DISTRICTS.

[Appropriations: Mississippi River; flood control, Mississippi River, and Sacramento River, Cal.; funds contributed for flood control, Mississippi River; maintenance and improvement of existing river and harbor works; increase of compensation, rivers and harbors, 1918; funds contributed for improvement of Mississippi River; repairing Government levee at Walnut Bend, Ark.; emergencies in river and harbor works; examinations, surveys, and contingencies of rivers and harbors; rebuilding levees of the Mississippi River and tributaries damaged by floods; maintaining and protecting levees of Mississippi River and tributaries against floods; for claims for damages by collision, river and harbor works.]

	Appropriation for Mississippi River, allotment for—				
	Upper St. Francis levee district.	Lower St. Francis levee district.	White River levee district.	Reelfoot levee district.	Gayoso Bend, Mo.
Amount expended on present project to end of last fiscal year	$820,300.00	$2,978,273.43	$2,534,645.80	$352,981.66	$56,508.56
Balance unexpended at end of last fiscal year	100,000.00	274,915.62	100,000.00	32,018.34	93,491.44
Amount appropriated or allotted since (net)	....	.70	....	....	....
	100,000.00	274,916.32	100,000.00	32,018.34	93,491.44
Amount expended from beginning of present fiscal year to end of previous month	70,867.57	274,916.32	100,000.00	32,018.34	93,491.44
Amount expended during the month	9,089.84	....	....	....	....
	79,957.41	274,916.32	100,000.00	32,018.34	93,491.44
Balance unexpended at end of month	20,042.59	....	....	....	....
In Treasury United States	10,515.00	....	....	....	....
In hand	9,527.59	....	....	....	....
	20,042.59	....	....	....	....
Amount covered by existing contracts at end of month	20,042.59	....	....	....	....

	Appropriation for Mississippi River, allotment for—				
	Barfield, Ark.	Osceola, Ark.	Bullerton Bar, Ark.	Norfolk, Miss.	Porter Lake, Ark.
Amount expended on present project to end of last fiscal year	$149,729.03	....	$65,242.68	....	$364,382.25
Balance unexpended at end of last fiscal year	50,270.97	$25,000.00	4,757.32	$40,000.00	70,546.34
Amount expended from beginning of present fiscal year to end of previous month	50,270.97	....	3,729.02	13,818.29	70,546.34
Amount expended during the month	....	....	1,028.30	4,974.24	....
	50,270.97	....	4,757.32	18,792.53	70,546.34
Balance unexpended at end of month	....	25,000.00	....	21,207.47	....
In Treasury United States	....	25,000.00	....	15,000.00	....
In hand	....	....	....	6,207.47	....
	....	25,000.00	....	21,207.47	....
Outstanding liabilities at end of month	....	....	....	13,500.00	....
Balance available at end of month	....	25,000.00	....	7,707.47	....

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FIRST AND SECOND DISTRICTS—Continued.

	Appropriation for Mississippi River, allotment for—			
	Helena, Ark.	Old Town Bend, Ark.	General repairs, and stone.	Plant.
Amount expended on present project to end of last fiscal year	$296,459.40	$437,658.18	$4,028.50	$1,888,795.96
Balance unexpended at end of last fiscal year	5,170.42	26,822.32	45,971.50	26,344.19
Amount appropriated or allotted since (net)				[1] 1,444.66
	5,170.42	26,822.32	45,971.50	27,788.85
Amount expended from beginning of present fiscal year to end of previous month	649.27	26,822.32	45,971.50	26,644.19
Amount expended during the month	.50			
	649.77	26,822.32	[2] 45,971.50	26,644.19
Balance unexpended at end of month	4,520.65			1,144.66
In Treasury United States	4,500.00			1,144.66
In hand	20.65			
	4,520.65			1,144.66
Balance available at end of month	4,520.65			1,144.66

	Appropriation for Mississippi River, allotment for—			
	New plant.	Memphis Harbor.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year	$734,686.80	$21,107.77	[3] $11,620,698.33	$22,325,498.35
Balance unexpended at end of last fiscal year	181,791.91	4,892.23		1,081,992.60
Amount appropriated or allotted since (net)				1,445.36
	181,791.91	4,892.23		1,083,437.96
Amount expended from beginning of present fiscal year to end of previous month	104,945.35	4,892.23		919,583.15
Amount expended during the month	29,009.04			44,101.92
	133,954.39	4,892.23		963,685.07
Balance unexpended at end of month	47,837.52			119,752.89
In Treasury United States	41,873.92			98,033.58
In hand	5,963.60			21,719.31
	47,837.52			119,752.89
Outstanding liabilities at end of month	45,000.00			58,500.00
Amount covered by existing contracts at end of month	2,837.52			22,880.11
	47,837.52			81,380.11
Balance available at end of month				38,372.78

---

[1] Amount $300, previously reported increased $1,144.66 received from New Orleans district for rental of barges.

[2] Distributed as follows: Hopefield Bend, Ark., $8,719.83; Memphis Harbor, $3,069.70; Norfolk, Miss., $1,845.05; Porter Lake, Ark., $6,835.91; Trotters Point, Miss., $1,497.84; Old Town Bend, Ark, $24,003.17.

[3] Upper Yazoo levee district, $1,468,703.45; Walnut Bend levee, preservation of works at, $28,200; preservation of works (levees), $17,909; preservation of works (revetment and contraction works, permanent channel improvement and protection), $36,958.89; Slough Landing Neck, Tenn., $206,385.36; chute of Island 26 (abatis dikes), $1,478.11; Plum Point Reach, $5,591,629.22; removal of Nonconnah Rock, $9,000; Golden Lake, Ark., $91,193.91; Walnut Bend, Ark., $346,309.92; Trotters Point, Miss., $99,688.10; Sunflower, Miss., $253,365.56; stone, $134,803.80; dredges and dredging, $388,097.12; experimental dikes, $54,924.42; Columbus, Ky., $43,750; at Hickman, Ky., $95,132; at New Madrid, Mo., $153,000; at Caruthersville, Mo., $80,314.37; at Memphis, Tenn., $45,000; improving harbor at Memphis, Tenn., $1,429,244.94; improving harbor at Memphis, Tenn. (Wolf River), $45,000; at Memphis, Tenn. (Wolf River), $25,786; Hopefield Bend (preservation of works at), $698,361.20; improving St. Francis River (Walnut Bend levee), $75,000; survey east bank Mississippi River, Bessie to Memphis, Tenn., $11,000; Star Landing, Miss., $16,611.69; Delta, Miss., $965.24; surveys, $162,886.03; Wolf River, $10,000.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FIRST AND SECOND DISTRICTS—Continued.

	Appropriation for flood control, Mississippi River, and Sacramento River, Cal., allotment for—					
	Surveys.	Upper St. Francis levee district.	Lower St. Francis levee district.	White River levee district.	Reelfoot levee district.	Gayoso Bend, Mo.
Amount appropriated or allotted since (net)	$5,000.00	$90,000.00	$450,000.00	$110,000.00	$10,000.00	$50,000.00
Amount expended from beginning of present fiscal year to end of previous month	5,000.00		119,505.29	85,134.54	10,000.00	30,718.60
Amount expended during the month			36,860.61	1,354.77		5,803.93
	5,000.00		156,365.90	86,489.31	10,000.00	36,522.53
Balance unexpended at end of month		90,000.00	293,634.10	23,510.69		13,477.47
In Treasury United States		90,000.00	302,935.10	5,241.67		
In hand			−9,301.00	18,269.02		13,477.47
		90,000.00	293,634.10	23,510.69		13,477.47
Outstanding liabilities at end of month		500.00	2,000.00	500.00		4,200.00
Amount covered by existing contracts at end of month		78,000.00	290,000.00	7,000.00		
		78,500.00	292,000.00	7,500.00		4,200.00
Balance available at end of month		11,500.00	1,634.10	16,010.69		9,277.47

	Appropriation for flood control, Mississippi River, and Sacramento River, Cal., allotment for—				
	Barfield, Ark.	Osceola, Ark.	Star Landing Miss.	Porter Lake, Ark.	Old Town Bend, Ark.
Amount appropriated or allotted since (net)	$100,000.00	$45,000.00	([1])	$130,000.00	$40,000.00
Amount expended from beginning of present fiscal year to end of previous month	77,875.05	31,541.01		85,570.02	40,000.00
Amount expended during the month	1,395.00			19,759.67	
	79,270.05	31,541.01		105,329.69	40,000.00
Balance unexpended at end of month	20,729.95	13,458.99		24,670.31	
In Treasury United States	20,573.16	8,658.99		2,064.20	
In hand	156.79	4,800.00		22,606.11	
	20,729.95	13,458.99		24,670.31	
Outstanding liabilities at end of month	1,000.00			7,000.00	
Balance available at end of month	19,729.95	13,458.99		17,670.31	

---

[1] Amount, $120,000, previously reported transferred to lower Yazoo levee district, third Mississippi River district, act of June 12, 1917, by resolution of Mississippi River Commission, Nov. 20, 1917, approved by Chief of Engineers, Nov. 26, 1917. (ED 15927-558.)

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FIRST AND SECOND DISTRICTS—Continued.

	Appropriation for flood control, Mississippi River, and Sacramento River, Cal., allotment for—				
	General repairs, and stone.	Plant.	New plant.	Memphis Harbor.	Total.
Amount appropriated or allotted since (net)	$35,000.00	[1] $77,626.39	$128,000.00	[2] $250,000.00	$1,520,626.39
Amount expended from beginning of present fiscal year to end of previous month	34,435.47	63,388.24	....	[3] 145,730.25	728,898.47
Amount expended during the month	564.53	12,727.90	....	[4] 38,243.07	116,709.48
	[5] 35,000.00	76,116.14	....	183,973.32	845,607.95
Balance unexpended at end of month	....	1,510.25	128,000.00	66,026.68	675,018.44
In Treasury United States	564.53	1,485.00	128,000.00	65,896.24	625,418.89
In hand	−564.53	25.25	....	130.44	49,599.55
	....	1,510.25	128,000.00	66,026.68	675,018.44
Outstanding liabilities at end of month	....	1,510.25	....	28,000.00	44,710.25
Amount covered by existing contracts at end of month	....	....	20,600.00	....	395,600.00
	....	1,510.25	20,600.00	28,000.00	440,310.25
Balance available at end of month	....	....	107,400.00	38,026.68	234,708.19

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Oct. 2, 1914, allotment for—				
	Upper St. Francis levee district.	Watson Point, Ky. (dike at Slough Landing Neck).	General repairs and stone.	Expended allotments	Total.
Amount expended on present project to end of last fiscal year	$100,000.00	$112,557.06	([6])	[7] $981,028.86	$1,193,585.92
Balance unexpended at end of last fiscal year	1,637.28	442.94	....	....	2,080.22
Amount expended from beginning of present fiscal year to end of previous month	....	442.94	....	....	442.94
Balance unexpended at end of month	1,637.28	....	....	....	1,637.28
In Treasury United States	1,637.28	....	....	....	1,637.28
Balance available at end of month	1,637.28	....	....	....	1,637.28

---

[1] Amount, $76,141.39, previously reported increased $1,485, account amount received from Vicksburg, Miss., engineer district, for rent of plant.

[2] Amount, $184,000, previously reported increased $66,000, account allotment by Mississippi River Commission from appropriation by sundry civil act, approved June 12, 1917. Approved by Chief of Engineers, June 26, 1918. (ED 15927–582.)

[3] Amount, $145,780.34, previously reported decreased $50.09, account reimbursement from appropriation "Pay, etc., of the Army" covering pay of engineer officer for part of months of August and September, 1917, payable by appropriation named.

[4] Includes $153.85 (transferred in Office Chief of Engineers to allotment for "Dredges and dredging") in settlement for value of coal received by transfer from office, Secretary, Mississippi River Commission.

[5] Distributed as follows: Watsons Point, dike at Slough Landing Neck, $55.88; Memphis Harbor, $3,559.77; Hopefield Bend, Ark., $1,027.89; Star Landing, Miss., $373.46; Porter Lake, Ark., $6,805.80; Trotters Point, Miss., $9,381.98; Delta, Miss., $821.17; Old Town Bend, Ark., $7,107.25; Stone (undistributed), $1,645.80; salvage of war materials (reimbursable), $4,221.

[6] Total expenditures ($60,000) under this allotment to end of fiscal year 1917, have been distributed to following works: Slough Landing Neck, Tenn., $16,498.17; Plum Point reach $1,260; Star Landing, Miss., $1,724.54; Trotters Point, Miss., $2,376.36; Delta, Miss., $20,257.67; Old Town Bend, Ark., $2,687.65; Sunflower, Miss., $13.83; plant (repairs), $13,607.43; stone, $1,574.35.

[7] Surveys, $1,500; Slough Landing Neck, Tenn., $191,498.17; Lower St. Francis levee district, $437,000; White River levee district, $160,000; Plum Point reach, $1,260; Star Landing, Miss., $106,724.54; Trotters Point, Miss., $2,376.36; Delta, Miss., $20,257.67; Old Town Bend, Ark., $2,687.65; Sunflower, Miss., $13.83; plant (repairs), $53,636.29; experimental revetment, $2,500; stone, $1,574.35.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FIRST AND SECOND DISTRICTS—Continued.

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—						
	Upper St. Francis levee district.	Lower St. Francis levee district.	White River levee district.	Slough Landing Neck, Tenn.	Delta, Miss.	General repairs and stone.	New plant.
Amount expended on present project to end of last fiscal year	$40,811.09	$314,999.69	$136,758.24	$191,241.75	$94,590.12	[1] $49,985.00	$40,000.00
Balance unexpended at end of last fiscal year	192,567.10	.96	23,242.21	493.69	215.75	15.00	15,000.00
Amount appropriated or allotted since (net)	....	....	102.55	....	....	....	....
	192,567.10	.96	23,344.76	493.69	215.75	15.00	15,000.00
Amount expended from beginning of present fiscal year to end of previous month	24,188.91	.96	23,344.76	493.69	215.75	15.00	....
Amount expended during the month	....	....	....	....	....	....	15,000.00
	24,188.91	.96	23,344.76	493.69	215.75	[2] 15.00	15,000.00
Balance unexpended at end of month	168,378.19	....	....	....	....	....	....
In Treasury United States	161,625.45	....	....	....	....	....	....
In hand	6,752.74	....	....	....	....	....	....
	168,378.19	....	....	....	....	....	....
Outstanding liabilities at end of month	148,000.00	....	....	....	....	....	....
Balance available at end of month	20,378.19	....	....	....	....	....	....

---

[1] Total expenditures ($49,985) under this allotment to end of fiscal year 1917, have been distributed to following works: Slough Landing Neck, Tenn., $535.30; Barfield, Ark., $1,545.98; Plum Point reach, $20,041.39; Hopefield Bend (preservation of works at), $7,296.03; Star Landing, Miss., $8,840.62; Sunflower, Miss., $172.50; plant (repairs), $9,979.81; stone, $1,573.37.

[2] Distributed as follows: Trotters Point, Miss., $15.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FIRST AND SECOND DISTRICTS—Continued.

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—				Funds contributed for improvement of Mississippi River (special fund).	
	Experimental revetment.	Memphis Harbor.	Expended allotments.	Total.	In upper St. Francis levee district.	At Norfolk, Miss.
Amount expended on present project to end of last fiscal year	$22,170.73	....	[1] $233,000.00	$1,123,556.62	$26,734.69	....
Balance unexpended at end of last fiscal year	30.66	$25,000.00	....	256,565.37	207,265.31	....
Amount appropriated or allotted since (net)	....	....	....	102.55	....	$50,000.00
	30.66	25,000.00	....	256,667.92	207,265.31	50,000.00
Amount expended from beginning of present fiscal year to end of previous month	30.66	25,000.00	....	73,289.73	62,580.62	50,000.00
Amount expended during the month	....	....	....	15,000.00	16,338.69	....
	30.66	25,000.00	....	88,289.73	78,919.31	50,000.00
Balance unexpended at end of month	....	....	....	168,378.19	128,346.00	....
In Treasury United States	....	....	....	161,625.45	105,000.00	....
In hand	....	....	....	6,752.74	23,346.00	....
	....	....	....	168,378.19	128,346.00	....
Outstanding liabilities at end of month	....	....	....	148,000.00	....	....
Amount covered by existing contracts at end of month	....	....	....	....	128,346.00	....
Balance available at end of month	....	....	....	20,378.19	....	....

Appropriations.	Funds contributed for flood control, Mississippi River (special fund).			
	Upper St. Francis levee district.	Lower St. Francis levee district.	White River levee district.	Total.
Amount appropriated or allotted since last fiscal year (net)	$45,000.00	$247,500.00	$55,000.00	$347,500.00
Amount expended from beginning of present fiscal year to end of previous month	....	....	9,064.44	9,064.44
Amount expended during the month	....	....	21,135.92	21,135.92
	....	....	30,200.36	30,200.36
Balance unexpended at end of month	45,000.00	247,500.00	24,799.64	317,299.64
In Treasury United States	45,000.00	225,500.00	15,000.00	285,500.00
In hand	....	22,000.00	9,799.64	31,799.64
	45,000.00	247,500.00	24,799.64	317,299.64
Amount covered by existing contracts at end of month	45,000.00	247,500.00	24,799.64	317,299.64
	45,000.00	247,500.00	24,799.64	317,299.64

---

[1] Surveys, $3,000; Plum Point reach, $155,000; plant, $75,000.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918.—Continued.

FIRST AND SECOND DISTRICTS—Continued.

Appropriations.	Expended appropriations.	Expended contributed funds (improving Mississippi River).	Expended contributed funds (flood control act).	Increase of compensation, rivers and harbors, 1918.	Grand total.
Amount expended on present project to end of last fiscal year	[1]$823,058.97	[2]$654,066.61	[3]$5,000.00		$26,151,501.16
Balance unexpended at end of last fiscal year					1,547,903.50
Amount appropriated or allotted since last fiscal year (net)				$8,000.00	1,927,674.30
				8,000.00	3,475,577.80
Amount expended from beginning of present fiscal year to end of previous month				6,308.52	1,850,167.87
Amount expended during the month				1,243.06	214,529.07
				7,551.58	2,064,696.94
Balance unexpended at end of month				448.42	1,410,880.86
In Treasury United States					1,277,215.20
In hand				448.42	133,665.66
				448.42	1,410,880.86
Outstanding liabilities at end of month					251,210.25
Amount covered by existing contracts at end of month					864,125.75
					1,115,336.00
Balance available at end of month				448.42	295,544.86

---

[1] Repairing Government levee at Walnut Bend, Ark., $90,000; emergencies in river and harbor works (for Wolf River), $8,000; examinations, surveys, and contingencies of rivers and harbors, $485; rebuilding levees of the Mississippi River and tributaries damaged by floods, $620,000; maintaining and protecting levees of Mississippi River and tributaries against floods, $104,558.97; for claims for damages by collision, river and harbor works, $15.

[2] For improvement of Mississippi River as follows: At Trotters Point, Miss., $100,000; near Memphis, Tenn, $1,066.61; near Laconia Circle, Ark., $8,000; at Star Landing Bend, Miss., $210,000; at Delta, Miss., $160,000; Reelfoot levee district in Kentucky, $25,000; at Gayoso Bend, Mo., $150,000.

[3] Contributed by the Fulton County Levee Board, Hickman, Ky., for the Reelfoot levee district, Kentucky.

Consolidated statement of conditions of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

THIRD DISTRICT.

[Appropriations: Mississippi River; flood control, Mississippi River, and Sacramento River, Cal.; funds contributed for flood control, Mississippi River; maintenance and improvement of existing river and harbor works; increase of compensation, rivers and harbors, 1918; funds contributed for improvement of Mississippi River; maintaining and protecting levees of the Mississippi River and tributaries against floods: rebuilding levees of the Mississippi River and tributaries damaged by floods; examinations, surveys and contingencies of rivers and harbors]

	Appropriation for Mississippi River, allotment for—					
	Surveys, third district.	Upper Tensas levee district.	Lower Yazoo levee district.	Lake Bolivar Front, Miss.	Ashbrook Neck, Miss.	Ashbrook Dike, Miss.
Amount expended on present project to end of last fiscal year	$151,456.53	$6,980,442.44	$5,823,718.96	$391,387.15	$804,424.08	$97,673.13
Balance unexpended at end of last fiscal year	5,000.00	303,454.05	54,996.85	3,862.45	38,345.62	144,326.87
Amount expended from beginning of present fiscal year to end of previous month	5,000.00	163,712.90	40,472.43	....	38,345.62	127,658.14
Amount expended during the month	....	[1] 9,173.74	....	....	....	[2] 4,493.91
	5,000.00	172,886.64	40,472.43	....	38,345.62	132,152.05
Balance unexpended at end of month	....	130,567.41	14,524.42	3,862.45	....	12,174.82
In Treasury United States	....	97,541.51	9,371.19	1,418.76	....	10,036.90
In hand	....	33,025.90	5,153.23	2,443.69	....	2,137.92
	....	130,567.41	14,524.42	3,862.45	....	12,174.82
Outstanding liabilities at end of month	....	3,460.27	....	2,047.82	....	4,343.53
Amount covered by existing contracts at end of month	....	114,017.26	14,524.42	....	....	....
	....	117,477.53	14,524.42	2,047.82	....	4,343.53
Balance available at end of month	....	13,089.88	....	1,814.63	....	7,831.29

	Appropriation for Mississippi River, allotment for—				
	Panther Forest, Ark.	Fitlers Bend, Miss.	Cottonwood, Miss.	Vicksburg, Miss.	Reid-Bedford Bend, La.
Amount expended on present project to end of last fiscal year	$310,110.59	$389,641.25	$214,376.17	$512,647.13	$336,488.09
Balance unexpended at end of last fiscal year	26,623.94	192.26	5,633.83	30,077.64	43,585.95
Amount expended from beginning of present fiscal year to end of previous month	26,623.94	192.26	5,633.83	30,077.64	43,585.95
	26,623.94	192.26	5,633.83	30,077.64	43,585.95

---

[1] Includes $269.19 in Treasury settlement No. 32388, for freight service.

[2] Includes $3.78 in Treasury settlement No. 31762, and $522.50 in Treasury settlement No. 32124, for freight service.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

THIRD DISTRICT—Continued.

	Appropriation for Mississippi River, allotment for—				
	Red Fork, Ark.	Repairs to existing works, and stone.	Plant.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year	$67,948.93	(1)	$2,494,596.00	[2] $7,910,505.99	$26,485,416.44
Balance unexpended at end of last fiscal year	12,026.07	$45,991.17	124,942.65		839,059.35
Amount appropriated or allotted since (net)			[3] 9,574.97		9,574.97
	12,026.07	45,991.17	134,517.62		848,634.32
Amount expended from beginning of present fiscal year to end previous month	12,026.07	45,991.17	89,094.83		628,414.28
Amount expended during the month			28,913.04		42,580.69
	12,026.07	[4] 45,991.17	118,007.37		670,994.97
Balance unexpended at end of month			16,510.25		177,639.35
In Treasury United States			27,888.27		146,256.63
In hand			−11,378.02		31,382.72
			16,510.25		177,639.35
Outstanding liabilities at end of month			16,510.25		26,361.87
Amount covered by existing contracts at end of month					128,541.68
			16,510.25		154,903.55
Balance available at end of month					22,735.80

[1] Amount ($54,033.83) expended during fiscal year 1917, distributed to following works: Fitlers Bend, $45,379.07; Greenville, Miss., $877.91; Vaucluse, Ark., $1,509.96; Albemarle Bend, $7.35; stone, third district, $6,259.54.

[2] Longwood, Miss., $157,010.28; Lake Providence Reach, $3,936,957.46; stone, third district, $510,208.72; Vaucluse, Ark., $155,027.13; Leland Neck, Ark., $198,850.72; survey east bank Mississippi River, Brunswick to Warrenton, Miss., $6,936.59; Beulah Crevasse, $550,000; Arkansas River levees, $50,000; Albemarle Bend, $594,826.49; Grand Lake, Ark., $159,456.47; Greenville, Miss., $1,290,679.79; Delta Point, La., $255,173.27; Fitlers Bend, $45,379.07.

[3] Amount ($5,818.66) previously reported increased $3,756.31, account $2,923.72 received from New Orleans, La., district for rental of plant; $702.59 received from Vicksburg, Miss., district for rental of plant, and $130 received from fourth Mississippi River Commission district for rental of plant.

[4] Distributed as follows: Panther Forest, Ark., $14,072.67; Fitlers Bend, Miss., $13,466.12; Cottonwood Miss., $5,571.41; Red Fork, Ark., $9,490.16; Greenville, Miss., $4; and stone, third district, $3,386.81.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

THIRD DISTRICT—Continued.

Appropriations.	Flood control, Mississippi River, and Sacramento River, Cal., allotment for—				
	Surveys, third district.	Upper Tensas levee district.	Lower Yazoo levee district.	Greenville, Miss.	Ashbrook Neck, Miss.
Amount appropriated or allotted since end of last fiscal year (net)	$5,000.00	$420,000.00	$540,000.00	$40,000.00	$72,000.00
Amount expended from beginning of present fiscal year to end of previous month	237.50	150,728.42	201,521.95	40,000.00	64,550.36
Amount expended during the month	253.98	[1] 24,474.20	40,500.73	....	.32
	−491.48	175,202.62	242,022.68	40,000.00	64,550.68
Balance unexpended at end of month	4,508.52	244,797.38	297,977.32	....	7,449.32
In Treasury United States	5,000.00	222,693.22	274,389.34	....	....
In hand	491.48	22,104.16	23,587.98	....	7,449.32
	4,508.52	244,797.38	297,977.32	....	7,449.32
Outstanding liabilities at end of month	2,272.75	65,894.08	85,089.60	....	3,721.47
Amount covered by existing contracts at end of month	....	83,178.33	167,028.73	....	....
	2,272.75	149,072.41	252,118.33	....	3,721.47
Balance available at end of month	2,235.77	95,724.97	45,858.99	....	3,727.85

Appropriations.	Flood control, Mississippi River, and Sacramento River, Cal., allotment for—			
	Fitlers Bend, Miss.	Princeton, Miss.	Reid-Bedford Bend, La.	Cottonwood, Miss.
Amount appropriated or allotted since end of last fiscal year (net)	$130,000.00	$120,000.00	$52,000.00	$140,000.00
Amount expended from beginning of present fiscal year to end of previous month	121,500.35	75,974.67	8,501.87	122,304.59
Amount expended during the month	[2] 2,456.69	[3] 8,031.67	[4] 2,493.08	[5] 4,396.50
	123,957.04	84,006.34	10,994.95	126,701.09
Balance unexpended at end of month	6,042.96	35,993.66	41,005.05	13,298.91
In Treasury United States	3,503.06	42,262.61	40,920.06	12,584.29
In hand	2,539.90	−6,268.95	84.99	714.62
	6,042.96	35,993.66	41,005.05	13,298.91
Outstanding liabilities at end of month	4,471.47	11,359.13	19,073.54	10,870.47
Balance available at end of month	1,571.49	24,634.53	21,931.51	2,428.44

---

[1] Amount $22,995.40, previously reported decreased $2,573.69, account $254.09, reimbursement from secretary's office, Mississippi River Commission, for coal; $376.83, reimbursement from New Orleans, La. District, for operating expenses of plant; and $1,942.77, reimbursement from Vicksburg, Miss., district, for operating expenses of plant.

[2] Includes $155 in Treasury settlement No. 32244, for demurrage service; and $234.35 in Treasury settlement No. 31904; $1,394.49 in Treasury settlement No. 32429; and $672.85 in Treasury settlement No. 32413, for freight service.

[3] Inculdes $1.24 in Treasury settlement No. 32145, for freight service.

[4] Inculdes $440.34 in Treasury settlement No. 31904 for freight service.

[5] Includes $155 in Treasury settlement No. 32244, for demurrage service; and $312.04 in Treasury settlement No. 31769; $234.34 in Treasury settlement No. 31904; $953.64 in Treasury settlement No. 32183; $1,394.49 in Treasury settlement No. 32429; and $672.85 in Treasury settlement No. 32413, for freight service

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

THIRD DISTRICT—Continued.

Appropriations.	Flood control, Mississippi River, and Sacramento River, Cal., allotment for—			
	Grand Lake, Ark.	Repairs to existing works, and stone.	Plant.	Total.
Amount appropriated or allotted since end of last fiscal year (net)	$80,000.00	$50,000.00	$108,000.00	$1,757,000.00
Amount expended from beginning of present fiscal year to end of previous month	39,603.78	[1] 20,421.71	[2] 104,856.68	950,201.82
Amount expended during the month	[3] 6,698.30	12,119.70	575.50	102,000.67
	46,302.08	[4] 32,541.41	105,432.18	1,052,202.55
Balance unexpended at end of month	33,697.92	17,458.59	2,567.82	704,797.45
In Treasury United States	33,551.08	23,145.01	2,959.48	661,008.15
In hand	146.84	−5,686.42	−391.66	43,789.30
	33,697.92	17,458.59	2,567.82	704,797.45
Outstanding liabilities at end of month	21,593.72	13,058.47	2,567.82	239,972.52
Amount covered by existing contracts at end of month	....	....	....	250,207.06
	21,593.72	13,058.47	2,567.82	490,179.58
Balance available at end of month	12,104.20	4,400.12	....	214,617.87

---

[1] Amount, $22,995.40, previously reported decreased $2,573.69, account $254.09, reimbursement from secretary's office, Mississippi River Commission, for coal; $376.83, reimbursement from New Orleans, La. district, for operating expenses of plant; and $1,942.77, reimbursement from Vicksburg, Miss., district, for operating expenses of plant.

[2] Amount, $105,194.37, previously reported decreased $337.69, account reimbursement from fourth Mississippi River Commission district, for repairs to tug Tunica.

[3] Inculdes $440.34 in Treasury settlement No. 31904, for freight service.

[4] Distributed as follows: Panther Forest, Ark., $8,380.13; Red Fork, Ark., $25.67; Greenville, Miss., $1,327.06; Vicksburg, Miss., $4,283.40; and stone, third district, $18,525.15.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

THIRD DISTRICT—Continued.

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Oct. 2, 1914, allotment for—				
	Upper Tensas levee district.	Lower Yazoo levee district.	Repairs to existing works, and stone.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year	$219,981.70	$260,552.38	(1)	[2] $312,015.40	$792,549.48
Balance unexpended at end of last fiscal year	180,018.45	111,447.62			291,466.07
Amount expended from beginning of present fiscal year to end of previous month	37,549.42	36,092.46			73,641.88
Amount expended during the month	6,010.85				6,010.85
	43,560.27	36,092.46			79,652.73
Balance unexpended at end of month	136,458.18	75,355.16			211,813.34
In Treasury United States	135,000.00	64,964.31			199,964.31
In hand	1,458.18	10,390.85			11,849.03
	136,458.18	75,355.16			211,813.34
Amount covered by existing contracts at end of month	136,458.18	75,355.16			211,813.34

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—					
	Surveys, third district.	Upper Tensas levee district.	Lower Yazoo levee district.	Ashbrook Neck, Miss.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year	$7,451.08	$166,798.41	$183,680.49	$48,225.17	[3] $724,390.79	$1,130,545.94
Balance unexpended at end of last fiscal year	2,548.92	34,501.59	7,620.51	26,774.83		71,445.85
Amount expended from beginning of present fiscal year to end of previous month	2,548.92	34,501.59	7,620.51	26,774.83		71,445.85

---

[1] Total expenditures ($55,232 60) under this allotment to end of fiscal year 1917, have been distributed to following works: Lake Bolivar Front, $2,503.18; Panther Forest, Ark., $30,529.03; Greenville, Miss., $1,664.60; Fitlers Bend, $7,990.74; Delta Point, La., $1,062.27; Albemarle Bend, $1.88; stone, $6,808.68; Vaucluse, Ark., $4,672.22.

[2] Greenville, Miss., $81,664.60; surveys, third district, $2,000; Fitlers Bend, $12,079.21; Delta Point, La., $1,431.17; Reid-Bedford Bend, $705.71; Ashbrook Neck, $643.07; Panther Forest, Ark., $44,624.50; Albemarle Bend, $4,105.47; Lake Bolivar Front, $7,438.43; Vaucluse, Ark., $7,699.37; stone, third district, $19,623.87; Grand Lake, Ark., $80,000; plant, third district, $50,000.

[3] Greenville, Miss., $110,969.50; Fitlers Bend, $75,740.55; Panther Forest, Ark., $120,006.50; Lake Bolivar Front, $70,000; Vaucluse, Ark., $6,795.50; stone, third district, $1,538.03; Grand Lake, Ark., $60,038.20; plant, third district, $182,378.41; Ashbrook dike, $88,924.10; experimental revetment, $8,000.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

THIRD DISTRICT—Continued.

Appropriations.	Funds contributed for flood control, Mississippi River (special fund).						
	Upper Tensas levee district.			Lower Yazoo levee district.	Greenville, Miss.		Total.
	Fifth Louisiana levee district.	Southeast Arkansas levee district.	Tensas Basin levee district.	Mississippi levee Commissioners.	Mississippi levee Commissioners.	Greenville, Miss.	
Amount appropriated or allotted since end of last fiscal year (net)	$71,334.00	$46,666.67	$92,000.00	$270,001.00	$22,500.00	$13,000.00	$515,501.67
Amount expended from beginning of present fiscal year to end of previous month	57,907.60	....	4,500.00	108,809.37	22,500.00	13,000.00	206,716.97
Amount expended during the month	1,595.65	....	6,370.50	19,716.69	....	....	27,682.84
	59,503.25	....	10,870.50	128,526.06	22,500.00	13,000.00	234,399.81
Balance unexpended at end of month	11,830.75	46,666.67	81,129.50	141,474.94	....	....	281,101.86
In Treasury United States	[1] 10,000.00	[2] 41,666.67	[3] 74,000.00	[4] 130,001.00	....	....	255,667.67
In hand	1,830.75	5,000.00	7,129.50	11,473.94	....	....	25,434.19
	11,830.75	46,666.67	81,129.50	141,474.94	....	....	281,101.86
Outstanding liabilities at end of month	11,830.75	....	30,824.50	30,824.50	....	....	73,479.75
Amount covered by existing contracts at end of month	....	46,666.67	....	87,719.94	....	....	134,386.61
	11,830.75	46,666.67	30,824.50	118,544.44	....	....	207,866.36
Balance available at end of month	....	....	50,305.00	22,930.50	....	....	73,235.50

[1] $10,000.00} Not yet in Treasury of United States. Deposited in local banks, covered by bonds, and
[2] $41.666.67} subject to check of President, Mississippi River Commission.
[3] $48,000.00} Of this amount not yet in Treasury United States. Deposited in local banks, covered by
[4] $70,000.00} bonds, and subject to check of President, Mississippi River Commission.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

THIRD DISTRICT—Continued.

Appropriations.	Expended appropriations.	Increase of compensation, rivers and harbors, 1918.	Grand total.
Amount expended on present project to end of last fiscal year	[1] $811,604.43		$29,220,116.29
Balance unexpended at end of last fiscal year			1,201,971.27
Amount appropriated or allotted since (net)		$5,000.00	2,287,076.64
		5,000.00	3,489,047.91
Amount expended from beginning of present fiscal year to end of previous month		4,151.97	1,934,572.83
Amount expended during the month		440.66	178,715.71
		4,592.63	2,113,288.54
Balance unexpended at end of month		407.37	1,375,759.37
In Treasury United States			1,262,896.76
In hand		407.37	112,862.61
		407.37	1,375,759.37
Outstanding liabilities at end of month		493.38	340,307.52
Amount covered by existing contracts at end of month			724,948.69
		493.38	1,065,256.21
Balance available at end of month		[2] −86.01	310,503.16

[1] Maintaining and protecting levees of the Mississippi River and tributaries against floods (protection of levees, third district, $170,618.52; protection of levees, Red River and tributaries, $5,729.35); $176,347.87; examinations, surveys, and contingencies of rivers and harbors (canal leading from Centennial Lake at Vicksburg, Miss., to the Mississippi River), $2,000; rebuilding levees of the Mississippi River and tributaries damaged by floods (lower Yazoo levee district, $210,000; upper Tensas levee district, $415,000; Red River levees, $8,256.56), $633,256.56.

[2] Estimate for $86.01 to be submitted.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FOURTH DISTRICT.

[Appropriations: Mississippi River; flood control, Mississippi River and Sacramento River, Cal.: funds contributed for flood control, Mississippi River; maintenance and improvement of existing river and harbor works; increase of compensation, rivers and harbors, 1918; emergencies in river and harbor works; maintaining and protecting levees of Mississippi River and tributaries against floods: removing sunken vessels or craft obstructing or endangering navigation; rebuilding levees of the Mississippi River and tributaries damaged by floods; funds contributed for improvement of Mississippi River.]

	Appropriation for Mississippi River, allotment for—					
	Surveys, gauges, and observations.	Lower Tensas levee district.	Atchafalaya levee district.	Lafourche levee district.	Barataria levee district.	Homochitto levee district.
Amount expended on present project to end of last fiscal year	$150,680.79	$4,776,620.92	$2,051,877.22	$900,913.67	$702,020.40	$2,508.89
Balance unexpended at end of last fiscal year	4,490.83	285,587.26	142,259.95	79,855.47	68,143.55	493.71
Amount expended from beginning of present fiscal year to end of previous month	4,440.99	135,040.67	69,223.83	73,778.08	16,219.58	69.71
Amount expended during the month	....	6,356.23	8,587.24	....	2,230.75	....
	4,440.99	141,396.90	77,811.07	73,778.08	18,450.33	69.71
Balance unexpended at end of month	49.84	144,190.36	64,448.88	6,077.39	49,693.22	424.00
In Treasury United States	....	137,956.53	61,830.19	....	28,009.63	2.35
In hand	49.84	6,233.83	2,618.69	6,077.39	21,683.59	421.65
	49.84	144,190.36	64,448.88	6,077.39	49,693.22	424.00
Outstanding liabilities at end of month	49.84	....	7,523.81	6,077.39	49,693.22	....
Amount covered by existing contracts at end of month	....	144,190.36	56,925.07	....	....	....
	49.84	144,190.36	64,448.88	6,077.39	49,693.22	....
Balance available at end of month	....	....	....	....	....	424.00

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FOURTH DISTRICT—Continued.

	Appropriation for Mississippi River, allotment for—				
	Pontchartrain levee district.	Lake Borgne levee district.	Hard Times Bend.	Bondurant.	Kempe Bend revetment.
Amount expended on present project to end of last fiscal year	$2,092,338.41	$622,537.25	$174,277.49	$90,359.84	$1,330,160.42
Balance unexpended at end of last fiscal year	95,255.89	37,023.86	70,722.51	23,140.16	29,839.58
Amount appropriated or allotted since (net)	[1] 1,740.84				
	96,996.73	37,023.86	70,722.51	23,140.16	29,839.58
Amount expended from beginning of present fiscal year to end of previous month	95,817.64	18,687.20	8,339.25	22,864.82	[2] 26,729.88
Amount expended during the month	.35	18.71			86.05
	95,817.99	18,705.91	8,339.25	22,864.82	26,815.93
Balance unexpended at end of month	1,178.74	18,317.95	62,383.26	275.34	3,023.65
In Treasury United States	1,238.34	4,007.50	48,044.44		3,023.65
In hand	−59.60	14,310.45	14,338.82	275.34	
	1,178.74	18,317.95	62,383.26	275.34	3,023.65
Outstanding liabilities at end of month		134.18		275.34	
Amount covered by existing contracts at end of month	1,178.74				
Balance available at end of month		18,183.77	62,383.26		3,023.65

[1] Amount, $1,406.87, previously reported increased $333.97, received from rental of levee machine barge, (ED 93650-24).

[2] Amount, $29,753.53, previously reported decreased $3,023.65 by reimbursement from third Mississippi River Commission district for rock.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FOURTH DISTRICT—Continued.

	Appropriation for Mississippi River, allotment for—				
	Giles Bend.	Marengo Bend.	Grand Bay.	General repairs and stone.	Plant.
Amount expended on present project to end of last fiscal year	$38,789.80	$54,788.89	$142,565.51	[1] $54,186.94	$1,330,846.90
Balance unexpended at end of last fiscal year	71,210.20	35,211.11	32,434.49	13,813.06	28,676.92
Amount appropriated or allotted since (net)					[2] 4,706.92
	71,210.20	35,211.11	32,434.49	13,813.06	33,383.84
Amount expended from beginning of present fiscal year to end of previous month	22,744.95	35,211.11	32,434.49	13,813.06	[3] 13,546.76
Amount expended during the month	6,836.79				
	29,581.74	35,211.11	32,434.49	[4] 13,813.06	13,546.76
Balance unexpended at end of month	41,628.46				19,837.08
In Treasury United States	35,002.93				21,940.48
In hand	6,625.53				−2,103.40
	41,628.46				19,837.08
Outstanding liabilities at end of month	12,635.69				4,173.16
Balance available at end of month	28,992.77				15,663.92

[1] Amount, $9,186.94, expended during the fiscal year 1917, distributed to following works: Harbor at New Orleans, La., $3,186.94; Plaquemine, La., revetment, $6,000.

[2] Amount, $4,656.72, previously reported increased $50.20 account $37.90 received for wear and tear of plant in building barge for "Panama Canal" (ED 91263–376), and $12.30 for wear and tear of plant in building barge for "First New Orleans, La., Engineer District" (ED 96661–32).

[3] Amount, $14,048.85, previously reported decreased $502.09 account reimbursement $379.09 from "Panama Canal" for building barge (ED 91263–76), and $123 from "First New Orleans, La., Engineer District" for building barge (ED 96661–32).

[4] Distributed as follows: Bondurant, $3,666.20; Kempe Bend revetment, $71.43; Grand Bay, $139.55; Plaquemine, La., revetment, $7,666.36; harbor at New Orleans, La., $639.77; Atchafalaya and Red Rivers, La., $1,629.75.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FOURTH DISTRICT—Continued.

	Appropriation for Mississippi River, allotment for—				
	Harbor at New Orleans, La.	Atchafalaya and Red Rivers, La.	Expended general allotments.	Expended specific allotments.	Total.
Amount expended on present project to end of last fiscal year	$1,052,335.80	$150,397.61	[1] $1,938,418.42	[2] $2,268,066.65	$19,924,691.82
Balance unexpended at end of last fiscal year	111,932.48	56.34	...	...	1,130,147.37
Amount appropriated or allotted since (net)	...	...	...	...	6,447.76
	111,932.48	56.34	...	...	1,136,595.13
Amount expended from beginning of present fiscal year to end of previous month	[3] 82,373.32	15.18	...	...	671,350.52
Amount expended during the month	15,705.56	...	...	...	39,821.68
	98,078.88	15.18	...	...	711,172.20
Balance unexpended at end of month	[4] 13,853.60	41.16	...	...	425,422.93
In Treasury United States	13,920.08	...	...	...	354,976.12
In hand	−66.48	41.16	...	...	70,446.81
	13,853.60	41.16	...	...	425,422.93
Outstanding liabilities at end of month	17,023.11	41.16	...	...	97,626.90
Amount covered by existing contracts at end of month	...	...	...	...	202,294.17
	17,023.11	41.16	...	...	299,921.07
Balance available at end of month	[4] −3,169.51	...	...	...	125,501.86

[1] Preservation of works, $134,000; Plaquemine, La., revetment, $150,000; Reid-Bedford Bend, $87,404.63; dredges and dredging, $2,506.99: Natchez and Vidalia Harbors, Miss. and La., $1,564,506.80.

[2] Improving harbors at Natchez and Vidalia, Miss. and La., $282,252.04; improving harbor at New Orleans, La., $979,639.86; improving Atchafalaya and Red Rivers, La., $1,001,709.40; survey east bank of Mississippi River from Warrenton to Baton Rouge, $4,465.35.

[3] Amount, $95,808.10, previously reported decreased $13,434.78 account reimbursement from Board of Commissioners, Port of New Orleans, for constructing and sinking mattresses. (ED 74811-61).

[4] Does not include $30,069.43 reimbursable from other districts.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FOURTH DISTRICT—Continued.

	Flood control, Mississippi River, and Sacramento River, Cal., allotment for—				
	Surveys.	Lower Tensas levee district.	Atchafalaya levee district.	Lafourche levee district.	Barataria levee district.
Amount appropriated or allotted since (net)	$5,010.25	$315,002.00	$130,000.00	$85,000.00	$80,001.25
Amount expended from beginning of present fiscal year to end of previous month	2,947.11	38,821.49	27,762.32	50,157.44	36,611.70
Amount expended during the month	899.13	657.50	9,192.87	16,067.70	1,984.56
	3,846.24	39,478.99	36,955.19	66,225.14	38,596.26
Balance unexpended at end of month	1,164.01	275,523.01	93,044.81	18,774.86	41,404.99
In Treasury United States	10.25	270,566.40	90,559.04	15,032.09	28,490.14
In hand	1,153.76	4,956.61	2,485.77	3,742.77	12,914.85
	1,164.01	275,523.01	93,044.81	18,774.86	41,404.99
Outstanding liabilities at end of month	807.79	....	40,067.98	....	9,662.76
Amount covered by existing contracts at end of month	....	275,523.01	52,976.83	18,774.86	31,742.23
	807.79	275,523.01	93,044.81	18,774.86	41,404.99
Balance available at end of month	356.22	....	....	....	....

	Flood control, Mississippi River, and Sacramento River, Cal., allotment for—				
	Pontchartrain levee district.	Lake Borgne levee district.	Hard Times Bend.	Bondurant.	Kempe Bend revetment.
Amount appropriated or allotted since (net)	$80,002.00	$50,000.00	$25,000.00	$25,000.00	$100,000.00
Amount expended from beginning of present fiscal year to end of previous month	49,845.01	12,099.10	131.94	18,672.34	100,000.00
Amount expended during the month	6,853.16	5,981.15	....	122.00	....
	56,698.17	18,080.25	131.94	18,794.34	100,000.00
Balance unexpended at end of month	23,303.83	31,919.75	24,868.06	6,205.66	....
In Treasury United States	22,035.13	17,975.90	24,868.06	....	....
In hand	1,268.70	13,943.85	....	6,205.66	....
	23,303.83	31,919.75	24,868.06	6,205.66	....
Outstanding liabilities at end of month	....	....	....	169.32	....
Amount covered by existing contracts at end of month	23,303.83	25,989.70	....	....	....
Balance available at end of month	....	5,930.05	24,868.06	6,036.34	....

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FOURTH DISTRICT—Continued.

	Flood control, Mississippi, River and Sacramento River, Cal., allotment for—				
	Giles Bend.	Marengo Bend.	Natchez Front.	Grand Bay.	Plaquemine, La., revetment.
Amount appropriated or allotted since (net)	$35,000.00	$30,000.00	$10,000.00	$150,000.00	$75,000.00
Amount expended from beginning of present fiscal year to end of previous month	10,839.95	10,507.84	2,833.37	31,001.02	75,000.00
Amount expended during the month	11,098.07	....	....	1,433.05	....
	21,938.02	10,507.84	2,833.37	32,434.07	75,000.00
Balance unexpended at end of month	13,061.98	19,492.16	7,166.63	117,565.93	....
In Treasury United States	15,538.54	14,694.66	4,166.63	116,552.48	....
In hand	−2,476.56	4,797.50	3,000.00	1,013.45	....
	13,061.98	19,492.16	7,166.63	117,565.93	....
Outstanding liabilities at end of month	....	134.96	287.60	137.10	....
Balance available at end of month	13,061.98	19,357.20	6,879.03	117,428.83	....

Appropriations.	Flood control, Mississippi River, and Sacramento River, Cal., allotment for—				
	General repairs, and stone.	Plant.	Harbor at New Orleans, La.	Atchafalaya and Red Rivers, La.	Total.
Amount appropriated or allotted since (net)	$34,000.00	[1] $80,241.88	$150,000.00	$15,002.00	$1,474,259.38
Amount expended from beginning of present fiscal year to end of previous month	30,792.90	[2] 47,027.09	[3] 12,297.07	10,907.35	568,255.04
Amount expended during the month	15.40	9,960.97	7,889.70	591.93	72,747.19
	[4] 30,808.30	56,988.06	20,186.77	11,499.28	641,002.23
Balance unexpended at end of month	3,191.70	[5] 23,253.82	[6] 129,813.23	3,502.72	833,257.15
In Treasury United States	....	38,138.76	125,305.40	2.00	783,935.48
In hand	3,191.70	−14,884.94	4,507.83	3,500.72	49,321.67
	3,191.70	23,253.82	129,813.23	3,502.72	833,257.15
Outstanding liabilities at end of month	46.75	7,752.57	17,033.00	621.11	76,720.94
Amount covered by existing contracts at end of month	....	....	....	....	428,310.46
	46.75	7,752.57	17,033.00	621.11	505,031.40
Balance available at end of month	3,144.95	[5] 15,501.25	[6] 112,780.23	2,881.61	328,225.75

---

[1] Amount, $75,885.08, previously reported increased $4,356.80, for wear and tear of plant constructing barges, etc., $3,851.55, from "First New Orleans, La., engineer district" (ED 99661-32-33-34), and $505.25 from "Panama Canal" (ED 91263-376).

[2] Amount, $90,595.03, previously reported decreased $43,567.94, account reimbursement for constructing barges, etc., $38,515.49, from "First New Orleans, La., engineer district (ED 99661-32-33-34), and $5,052.45 from "Panama Canal" (ED 91263-376).

[3] Amount, $25,579.74 previously reported decreased $13,282.67, account reimbursement from Board of Commissioners of the Port of New Orleans, La., for constructing and sinking mattresses in front of docks, etc.

[4] Distributed as follows: Bondurant, $12,253.93; Kempe Bend revetment, $1,777.83; Grand Bay, $917.10; Plaquemine, La., revetment, $14,343.25; Atchafalaya and Red Rivers, La., $1,516.19.

[5] Does not include $6,366.39 } Reimbursable from other districts.
[6] Does not include $10,192.61 }

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FOURTH DISTRICT—Continued.

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Oct. 2, 1914, allotment for— Lower Tensas levee district.	Natchez Front.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year	$254,016.42	$11,807.18	[1] $786,778.61	$1,052,602.21
Balance unexpended at end of last fiscal year	20,983.58	192.82		21,176.40
Amount expended from beginning of present fiscal year to end of previous month		192.82		192.82
Amount expended during the month	611.66			611.66
	611.66	192.82		804.48
Balance unexpended at end of month	20,371.92			20,371.92
In hand	20,371.92			20,371.92
	20,371.92			20,371.92
Amount covered by existing contracts at end of month	20,371.92			20,371.92

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for— Surveys.	Lower Tensas levee district.	Atchafalaya levee district.	Pontchartrain levee district.	Hard Times Bend.	Kempe Bend revetment.
Amount expended on present project to end of last fiscal year	$4,691.32	$137,564.64	$49,468.40	$39,250.58	$120,999.99	$19,998.43
Balance unexpended at end of last fiscal year	122.84	112,242.36	34,487.12	866.92		1.57
Amount expended from beginning of present fiscal year to end of previous month	122.84	27,905.27	21,448.29	866.92		1.57
Amount expended during the month			1,667.22			
	122.84	27,905.27	23,115.51	866.92		1.57
Balance unexpended at end of month		84,337.09	11,371.61			
In Treasury United States		66,160.06	8,955.52			
In hand		18,177.03	2,416.09			
		84,337.09	11,371.61			
Amount covered by existing contracts at end of month		84,337.09	11,371.61			

[1] Lafourche levee district, $100,000; Barataria levee district, $76,265; Lake Borgne levee district, $75,000; Giles Bend, $40,184.25; Plaquemine, La., $50,000; plant, $60,513.61; Harbor at New Orleans, La., $54,529.13; Atchafalaya and Red Rivers, La., $15,000; Hard Times Bend, $22,714.44; Bondurant, $2,319.22; Atchafalaya levee district, $125,000; Pontchartrain levee district, $100,000; Kempe Bend revetment, $60,252.96; Marengo Bend, $5,000.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FOURTH DISTRICT—Continued.

Appropriations.	Maintenance and improvement of existing river and harbor works act of Mar. 4, 1915, allotment for—					
	Plaquemine, La., revetment.	General repairs, and stone.	Harbor at New Orleans, La.	Atchafalaya and Red Rivers, La.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year	$28,385.18	(1)	$37,675.91	$19,832.85	[2]$441,729.95	$899,597.25
Balance unexpended at end of last fiscal year						147,720.81
Amount expended from beginning of present fiscal year to end of previous month						50,344.89
Amount expended during the month						1,667.22
						52,012.11
Balance unexpended at end of month						95,708.70
In Treasury United States						75,115.58
In hand						20,593.12
						95,708.70
Amount covered by existing contracts at end of month						95,708.70

Appropriations.	Funds contributed for control, Mississippi River (special fund).						
	Fifth Louisiana levee district.	Atchafalaya Basin levee district.	Lafourche Basin levee district.	Pontchartrain levee district.	Lake Borgne Basin levee district.	Buras levee district.	Total.
Amount appropriated or allotted since (net)	$157,500.00	$65,000.00	$74,500.00	$40,000.00	$25,000.00	$8,000.00	$370,000.00
Balance unexpended at end of month	157,500.00	65,000.00	74,500.00	40,000.00	25,000.00	8,000.00	370,000.00
In Treasury United States	157,500.00	65,000.00	74,500.00	40,000.00	25,000.00	8,000.00	370,000.00
Amount covered by existing contracts at end of month	157,500.00	65,000.00	74,500.00	40,000.00	25,000.00		362,000.00
Balance available at end of month						8,000.00	8,000.00

---

[1] Total expenditures ($20,425.82) under this allotment to end of fiscal year 1917, have been distributed to following works: Harbor at New Orleans, La., $10,499.64; Bondurant, $2,192.49; Marengo Bend, $3,462.02; Giles Bend, $4,271.67.

[2] Bondurant, $2,192.49; Lafourche levee district, $25,739.08; Barataria levee district, $62,236; Lake Borgne levee district, $41,006; plant, $103,138.69; harbors at Natchez and Vidalia, Miss. and La., $194,634; general repairs, and stone (Marengo Bend, $3,462.02; Giles Bend, $4,271.67), $7,733.69.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1918—Continued.

FOURTH DISTRICT—Continued.

Appropriations.	Expended appropriations.	Expended contributed funds.	Increase of compensation, rivers and harbors, 1918.	Grand total.
Amount expended on present project to end of last fiscal year	[1] $424,575.30	[2] $34,921.02		$22,336,387.60
Balance unexpended at end of last fiscal year				1,299,044.58
Amount appropriated or allotted since (net)			$17,000.00	1,867,707.14
			17,000.00	3,166,751.72
Amount expended from beginning of present fiscal year to end of previous month			[3] 12,316.61	1,302,459.88
Amount expended during the month			1,527.13	116,374.88
			13,843.74	1,418,834.76
Balance unexpended at end of month			3,156.26	1,747,916.96
In Treasury United States			366.61	1,584,393.79
In hand			2,789.65	163,523.17
			3,156.26	1,747,916.96
Outstanding liabilities at end of month			444.88	174,792.72
Amount covered by existing contracts at end of month				1,108,685.25
			444.88	1,283,477.97
Balance available at end of month			2,711.38	464,438.99

---

[1] Emergencies in river and harbor works (for Giles Bend, Miss., $40,000; for Old River, $10,000), $50,000. Maintaining and protecting levees of the Mississippi River and tributaries against floods (fourth district, $141,786.32; Atchafalaya River and Bayou des Glaises, $31,431.05), $173,217.37. Removing sunken vessels or craft obstructing or endangering navigation, $9,500. Rebuilding levees of Mississippi River and tributaries damaged by floods (lower Tensas levee district, $6,985.66; Lafourche levee district, $105,318.56; Lake Borgne levee district, $551.96; east bank Mississippi River from Vicksburg to Bayou Sara, $23,402.56; sundry breaks Bayou des Glaises and Atchafalaya River, $55,599.19), $191,857.93.

[2] Funds contributed for improvement of Mississippi River at Avondale, La., $32,467.28; funds contributed for improvement of Mississippi River at Torras, La., $2,453.74.

[3] Amount $12,653.22, previously reported decreased $336.61, by reimbursement from board of commissioners, port of New Orleans, La., for constructing and sinking mattress.

APPENDIXES ACCOMPANYING THE ANNUAL REPORT OF THE MISSISSIPPI RIVER COMMISSION FOR THE FISCAL YEAR ENDING JUNE 30, 1918.

Appendix 1.

Page.

Report of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission, on works in his charge (13 plates) ---------- 3521

Appendix 2.

Report of Montgomery Gardner, assistant engineer, on operations in first and second districts (20 plates) ---------- 3580

Appendix 3.

Report of A. M. Todd, assistant engineer, on operations in third district (13 plates) ---------- 3630

Appendix 4.

Report of Lieut. Col. G. McC. Derby, United States Army, on operations in fourth district (13 plates) ---------- 3677

Appendix 5.

Topical index to annual report of the Mississippi River Commission for 1918 ---------- 3733

APPENDIX 1.

IMPROVEMENT MISSISSIPPI RIVER IN CHARGE OF THE SECRETARY, MISSISSIPPI RIVER COMMISSION.

REPORT OF E. J. THOMAS, ASSISTANT ENGINEER, SECRETARY MISSISSIPPI RIVER COMMISSION, ASSISTANT ENGINEER IN CHARGE, FOR THE YEAR JUNE 1, 1917, TO MAY 31, 1918.

IMPROVEMENTS, ETC.

1. Mississippi River Commission.
2. Surveys, gauges, and observations.
3. Dredges and dredging.
4. Levees, Cape Girardeau, Mo., to Rock Island, Ill.

1. MISSISSIPPI RIVER COMMISSION.

The duties of the secretary under this allotment consists in payment of salaries and clerical, office, mileage, and miscellaneous expenses of the Mississippi River Commission; in the publication of the official reports and defraying the expenses of the semiannual and other trips of the commission, and the care and repair of the steamer *Mississippi*.

The Mississippi River Commission held four sessions during the year. The one hundred and thirty-ninth was held in St. Louis, Mo.; the one hundred and fortieth at Memphis, Tenn.; the one hundred and forty-first and the one hundred and forty-second on the United States steamer *Mississippi* from St. Louis, Mo., 191 miles above Cairo, to New Orleans, La., 967 miles below Cairo.

The proceedings of these sessions and monthly reports of operations have been printed and issued.

For expenditures, see money statements, pages 3534–3538.

2. SURVEYS, GAUGES, AND OBSERVATIONS.

Location and description.—This work covers the Mississippi River from Head of Passes to the headwaters at Lake Itasca, a distance by river of 2,460 miles.

The tributaries and Gulf coast at various places are also included for gauges and observations. Surveys are made of the Mississippi River when ordered by the commission. Discharge measurements are made annually at all of 11 gauging stations on the Mississippi River and 11 stations on tributaries, at which river stages prescribed by the commission are reached during the year.

Original condition.—Lack of surveys and physical data made studies of the river incomplete.

Previous projects.—Various surveys and examinations have been made and maps published covering portions of the rivers in this district, but no comprehensive project had been adopted previous to the present one.

Existing project.—The existing project was adopted by act approved June 28, 1879, which reads in part as follows:

"SEC. 3. It shall be the duty of said commission to direct and complete such surveys of said river, between the Head of the Passes near its mouth to its headwaters as may now be in progress, and to make such additional surveys, examinations, and investigations, topographical, hydrographical, and hydrometrical, of said river and its tributaries as may be deemed necessary; * * *"

Operations and results during fiscal year.—The scientific records, maps, and construction drawings of the secretary's office, have been catalogued and card indexed. A contract for printing maps of the resurvey of the Mississippi River between high-water banks from Cairo, Ill., to the mouth of Red River, La., a distance of 772 miles by river, was entered into January, 1917. Slow progress has been made on the work of printing—the contract is now about 22 per cent completed.

Bids were invited by advertisement for printing title sheets, index maps, etc., for detail charts and inch-to-mile maps above and below Cairo.

The printing of the annual pamphlet for the calendar year 1916, Stages of the Mississippi River and of its Principal Tributaries, in progress at last report, was completed; this pamphlet for the calendar year 1917, now being printed, is 75 per cent completed.

The computation of discharge measurements taken during the year 1917 was completed.

The hourly readings for the calendar year 1917 were scaled and tabulated from the rolls of the automatic tide gauges at Biloxi, Miss., and East Bay, La.

The hydrographs of the Mississippi River and tributaries for calendar year 1917, are being prepared in four sheets for blue printing. A hydrograph of the Mississippi River from Cairo, Ill., to Fort Jackson, La., for the period June 1, 1917, to May 31, 1918, is herewith, designated as plate 1.

The 38 regular gauges in charge of this office on the Mississippi River and tributaries, have been inspected and maintained during the year. Continuous daily readings on these gauges have been observed and reported; and the readings have been tabulated and plotted on the office hydrographs. The automatic tide gauges at Biloxi, Miss., and East Bay, La., and the 185 high-water gauges on the Mississippi River from Cairo, Ill., to Head of Passes, La., have been inspected and maintained during the year.

High-water discharge observations were made at Thebes, Ill., 44.5 miles above Cairo, June 16 to 18, 1917; and at St. Charles, Mo., on the Missouri River, June 14–15, 1917. The discharge of the Mississippi River was measured during low water at Friar Point, Miss. (319), December 25, 1917, Arkansas City, Ark. (438), December 24 to 26, 1917, and at Carrollton, La. (957), January 25 to 30, 1918. The tabulated results of high-water observations made during March–June, 1917, and low-water observations of this year, are printed in Table No. 3, appended hereto.

The reduction of field notes of the Atchafalaya River survey, ordered by the provisions of the river and harbor act of July 27, 1916, having been delayed by reason of depletion of office force by war service, is still in progress.

The expenditures during the year amounted to $37,007.65.

Condition at end of fiscal year.—The general survey was completed in 1904 and maps have been published covering the entire river. Special surveys have been made of the lower river between the mouth of the Ohio River and Carrollton, La. (957), to determine changes in bank line and section; between Cairo, Ill., and Donaldsonville, La. (885), to determine the amount of bank erosion, and at various other localities for the collection of physical data. A survey for the restoration of the permanent marks of the general survey below Cairo, begun at Cairo in the fall of 1905, was completed to Donaldsonville, La., base line, 890.5 miles below Cairo, in January, 1910. A resurvey of the river between high-water banks from Cairo to mouth of Red River, a distance of 772 miles by river, begun at Cairo in 1911, was completed in January, 1914. Surveys were completed in February, 1914, in the vicinity of New Orleans, La., in connection with proposed spillways to reduce flood heights. A survey of the Atchafalaya River from Barbre Landing to the junction of the Little Atchafalaya and upper Grand Rivers, was made in 1904–5. The field work of a survey of the Atchafalaya River from its head to Morgan City, La., was completed in 1917. Gauges have been established and maintained at various places on the Mississippi River and tributaries and the Gulf of Mexico, and the readings published. Discharge and other observations have been made on the Mississippi River and tributaries at various stations, and the results published in part. Physical data have been compiled and card indexed. Printing maps, scale 1 inch=1 mile, and detail charts, scale 1:20,000, of the resurvey from Cairo, Ill., to the mouth of Red River, La., and reprinting charts and maps, the supply of which is almost exhausted, is in progress. The gauges are being maintained; computation of discharge measurements made in 1917 was completed; and printing of pamphlet, Stages of the Mississippi River and Its Principal Tributaries During 1917, is in progress.

The total expenditures to May 31, 1918, amount to $2,739,096.64. In addition to the foregoing, $15,000 was expended for spillway surveys.

Local cooperation.—None.

Effect of improvement.—The surveys, gauge readings, and other observations made and now being made, furnish valuable data for the study of the river in formulating and perfecting plans for improvement.

Proposed operations.—It is proposed to publish the maps and charts now ready for publication, maintain gauges, make discharge and other observations, continue the collection and compilation of physical data, and make such other surveys and observations as may from time to time be ordered by the commission.

3. DREDGES AND DREDGING.

Location.—The portion of the Mississippi River included in this district for dredging extends over about 1,066 miles of river from the mouth of the Ohio River to Head of Passes, La. The lower end of the district is 13½ miles from the Gulf of Mexico by South Pass and 19½ miles by Southwest Pass.

Original condition.—Depths of 5 and 5½ feet prevailed during low water on crossings in the upper portion of this district before operations were begun by the United States. Below the mouth of Red River the channel depths were ample for the requirements of navigation to the lower limits of this district.

Previous projects.—There had been no project for dredging by the United States in this district previous to the existing project.

Existing project.—The existing project was defined in the rivers and harbors act of June 3, 1896, carrying the first appropriation for this work, which was to be expended as follows:

" * * * In the construction of suitable dredge boats and other devices and appliances and in the maintenance and operation of the same, with the view of ultimately obtaining and maintaining a navigable channel from Cairo down, not less than two hundred and fifty feet in width and nine feet in depth at all periods of the year except when navigation is closed by ice: * * *"

Operations and results during the year.—During the low-water season of 1917, four dredges, the *Gamma*, *Iota*, *Henry Flad*, and *B. M. Harrod*, were operated at 10 crossings from Morrissons, 70 miles below Cairo, to Red River Crossing, 766 miles below Cairo.

Operations and results during the year.—At the beginning of August the Cairo gauge registered 25 feet, with a continued fall indicated. The *Henry Flad* and *B. M. Harrod* were prepared for service and were started up the river on August 9 and 12, respectively, followed by the *Iota* on August 27 and the *Gamma* on September 25.

The river declined gradually from the 1st of August to September 23, when the gauge at Cairo read 10.4 feet. From September 23 to October 27 the stage varied from 6.7 feet to 10.7 feet. On the latter date a rise set in, which crested at Cairo on November 9 at 19.2 feet, after which the river again declined to below 10 feet to the end of 1917. Navigation was suspended about the middle of December on account of ice. The minimum reading for the season was 4 feet at Cairo and —0.5 feet at Memphis on December 16 and 18, respectively.

The work performed by each dredge and place at which dredging was done, are given in table No. 7, accompanying.

The total amount of material moved by all these dredges during the season was 1,327,016 cubic yards.

Twenty-five inspection trips were made with the steamer *Inspector M. R. C.* over stretches of the river from head of Toneys Chute, 76 miles below Cairo, to Vicksburg, 599 miles below Cairo. The least depths found at the various crossings on these trips are given in table No. 5, accompanying.

Eighty-three surveys were made of 24 shoal crossings from Morrissons, 70 miles below Cairo, to Red River Crossing, 766 miles below Cairo. The dimensions of channels determined from the surveys are given in table No. 6, accompanying.

In addition to the above, two surveys were made of harbor at Osceola, Ark., 165 miles below Cairo; three of Tennessee Chute at head of Presidents Island, 233 miles below Cairo; and four of entrance to Old River, 764 miles below Cairo.

Dredging operations, dredge "Gamma."—The dredge *Gamma* was placed in commission and left the dredge fleet (232) September 25 for Foot of Cow Island Crossing (252). It arrived at this crossing at 7.20 a. m. September 26, and dredging was commenced at 2.10 p. m. on that date. This work was completed at 12.30 p. m. on October 4, when the dredge was moved to the bank to await a lower stage. A considerable amount of stiff mud and coarse gravel was encountered.

The *Gamma* left for the dredge fleet (232) on October 9, for the purpose of filling out the crew. A full complement was secured, with the exception of one fireman, on the 15th, and it departed for Fords Crossing (710) at 12.30 p. m. on that date, arriving there at 8.05 a. m. on the 25th. Dredging was commenced in this crossing at 3.25 p. m. October 25 and was completed at 12.30 p. m. October 30, producing an excellent channel.

The dredge departed for Red River Crossing (766) at 11 a. m. October 31, and arrived at Angola, just above the crossing, at 10.20 a. m. November 1. On completion of survey of Red River Crossing, the *Gamma* left the bank at Angola at 7 a. m. November 2 and moved out into the crossing. Dredging was commenced at 5 p. m. on the 4th. The work in this crossing was completed at 12.30 p. m. on the 7th.

On November 8 at 7.10 a. m. the dredge left the bank in the vicinity of Red River (764) and proceeded upstream, arriving at Natchez (700) at 5.30 p. m. on the 10th, and at Vicksburg, Miss. (599), at 5.40 p. m. on the 15th.

The *Gamma* left Vicksburg at 12 noon November 27 for the mouth of Red River (764), for the purpose of dredging entrance to Old River, and arrived at that point at 4 p. m. on the 30th. After cleaning boilers and making other preparations, the *Gamma* attempted to move into position on December 3, but grounded on the head of the middle bar on account of fog. The dredge was released by the steamer *Sarah Eidenborn*. Dredging was commenced at 5 p. m. December 3 and continued until 6.05 p. m. on the 8th, when the work projected had been completed. On completion of the work the dredge was moved to the bank to await a lower stage of water, and coal.

On December 18 the *Gamma* was moved to Angola incline (764), where any coal which might be received by rail would have to be delivered. Efforts to obtain even a small supply of coal for this dredge by rail delivery proved unsuccessful. The shortage of coal in the lower river interfered with the operation of the *Gamma*. On December 28 the dredge was moved across the river to Red River Landing (765), where a small amount of slack coal had been purchased. On December 27 the steamer *John Ewens* left the dredge fleet, towing loaded West Kentucky Coal Barge *No. 587* for the *Gamma*, and arrived at the *Gamma* on January 2. The *Gamma* left Angola on January 4 and arrived at Natchez (700) at 2.15 p. m. on the 5th. On account of needed repairs to the stokers, only one battery of boilers could be used. The repairs to the stokers were completed at Natchez January 9, and the *Gamma* left for up the river at 4 p. m. on that date.

On reaching Lake Providence (542) at 4 p. m. January 17, running ice was met and it was necessary for the dredge to tie up above the town, where there was a good ice harbor. It remained at this place until 9.30 a. m. on the 28th, when it proceeded upstream. Rosedale, Miss. (398), was reached at 3.45 p. m. February 2 and the *Gamma* tied up there while the heavy ice was passing. On February 10 the river had become clear of ice and at 5.30 a. m. on this date the towing was resumed, and the dredge and plant arrived at the dredge depot (232) at 2 p. m. on February 15. The crew was disbanded on this date and the draining and laying up of the machinery was commenced.

Dredge "Iota."—The *Iota* left the dredge fleet (232) at 5 p. m. August 27 for Drivers Crossing (169) and arrived in the crossing at 12.30 p. m. September 1. Dredging was commenced at 12 midnight on the 3d and continued until 10.30 a. m. on the 8th. On the 10th the dredge was shifted upstream about 700 feet and dredging was commenced in this upper location at 12.30 p. m. and continued until 6.40 a. m. on the 11th, when the dredge was moved out of the crossing and tied to the bank at Osceola Towhead (165), to await a lower stage.

On completion of the work a survey showed that the channel was narrow at one point, and that the cuts should have been extended farther upstream. The dredge was placed in the crossing again September 14, and work continued until 9 a. m. on the 16th, when the dredge was again moved to the bank to await a lower stage. The material encountered was sand with a considerable amount of gravel.

The *Iota* was again placed in Drivers Crossing on September 27 and commenced dredging at 2.50 p. m. on that date. The object of this work was the widening of the channel. The work was completed at 5.15 a. m. October 1, when the dredge was moved to the bank to await a lower stage.

The *Iota* lay at the bank in the vicinity of Osceola (165) awaiting a lower stage until October 15, when dredging was commenced in Foot of Island 30 Crossing (161). This work was completed at 4 p. m. on the 18th. No further work was required of the *Iota* and it remained at the bank in this vicinity until 2.30 p. m. November 23, when it left for the dredge fleet and arrived there at 1 p. m. on the 24th.

The *Iota* remained at the bank at the dredge fleet awaiting a lower stage until December 3, when it was moved to head of Presidents Island (233) to open a channel for boats down to the left of the island in Tennessee Chute. This work was commenced at 3.10 p. m. December 3, and completed at 8.30 p. m. on the 5th. Gravel was encountered, which rendered progress slow. On completion of this work the *Iota* was moved to the dredge fleet, where it remained until it was withdrawn from commission on December 31.

Dredge "Kappa."—The *Kappa*, which had been engaged on work in Memphis Harbor (230), under direction of the first and second Mississippi River Commission districts, was returned to the dredge fleet on October 23. On October 28, on account of an extended rise in the river stage and the limited supply of coal, the *Kappa* was withdrawn from commission.

Dredge "Henry Flad."—The *Flad* was placed in commission and left the dredge fleet (232) August 9 for Plum Point Crossing (164) and arrived there at 9.30 a. m. on the 12th. It left Plum Point Crossing for Blue Grass Crossing (132), where dredging was more urgently needed at 10 a. m. on the 17th and arrived at Blue Grass at 12.30 a. m. on the 18th. Dredging was commenced at 1.30 p. m. on the 19th and continued until 1.40 p. m. on the 22d, when work was suspended on account of shortage of stokers and the necessity for installing pipes for washing light cinders out of the ash chutes. A satisfactory channel was completed for the stage then existing.

The *Flad* was moved to River Styx Crossing (139) on August 23, and on completion of the repair work mentioned above and securing a full crew of stokers, commenced dredging at 2.20 p. m. on the 30th. Dredging in River Styx Crossing was completed at 2.45 p. m. on September 12. On September 10 piles were pulled and shifted downstream about 900 feet, in order to extend the cuts through the reef to the lower pool. The material in this crossing was very difficult, as it contained a large percentage of gravel. An excellent channel was produced with a depth of 11½ feet and more than the project width.

On completion of the work in River Styx Crossing, the *Flad* was moved to the bank to await a lower stage, and remained there until 10.40 a. m. September 20, when it departed for Blue Grass Crossing (132), arriving there at 2.20 p. m. on the same day. Dredging was commenced at 3.50 p. m. on this date and continued until the 26th, when the dredge was moved out of the channel and tied up to the bank to await a lower stage.

On September 29 the *Flad* was again moved to River Styx Crossing (139) and tied to the bank there to await a lower stage.

The *Flad* departed for Gayoso Crossing (104) at 5.30 a. m. on October 11 and arrived there at 7.50 a. m. on the 12th. Dredging in this crossing was commenced at 3 p. m. on this date and continued until 2 p. m. on the 20th, when the work was completed. The work in Gayoso Crossing was very difficult, on account of the form of the bar, which necessitated dredging at an angle with the current.

The *Flad* left Gayoso Crossing (104) at 4.10 p. m. October 20 for the vicinity of foot of Island No. 21 (131) and arrived at Hickmans Light at 8.10 a. m. on the 22d. On the 25th it was moved down to Blue Grass Crossing (132), where dredging was commenced at 7 a. m. on the 26th. This work, which was the removing of lumps and widening of the channel, was completed at 1.10 a. m. on the 28th. The dredge was moved down to the head of River Styx Crossing (139) and tied to the bank there, to await a lower stage, where it remained until November 23, when it was moved to the vicinity of Osceola, Ark. (165).

The *Flad* remained at the bank in front of Osceola awaiting a lower stage until December 7, when it was moved up to the shoal which obstructed the entrance to the harbor at Osceola and Luxora. Before completion of the work it was necessary to move the dredge into a harbor which would be protected from floating ice. The work was discontinued at 9.35 a. m. on the 10th and the dredge moved to the bank and tied up.

On December 16 the floating ice gorged just below the *Flad*, deflecting the current in the crossing at the foot of chute of Island No. 30 upstream until it struck directly against the point where the *Flad* was tied to the bank. This forced the free ice in the river above the gorge upstream until it filled the river abreast and above the *Flad* and crowded the dredge out on the bank damaging her coal barge and wrecking the wheel of the steamer *Venus*, which was alongside. The *Flad* remained in a precarious position, with one corner on the bank, until she was pulled off by the steamer *Wynoka* on December 20. On the 25th the *Flad* was again pushed out on the bank by the extended movement of ice, and the barge, which had been previously damaged, was completely wrecked. One section of the pontoons was broken loose and carried some distance downstream by the ice. The pressure of the ice, however, forced it on the bank and it was later recovered. The *Flad* left the bank below Osceola (165) for the dredge fleet (232) at 8.45 a. m. on December 26 and arrived at 9.15 a. m. on the 27th. The dredge remained at the bank at the dredge fleet until the close of the month and was then withdrawn from commission.

Dredge "B. M. Harrod."—The *Harrod* left the dredge fleet (232) on August 12 for Gayoso Crossing (104). It arrived at Caruthersville (110) at 5.15 p. m. on the 15th, where a stop was made to secure additional labor, and left at 9.30 a. m. on the 16th, arriving at Gayoso Landing (104) at 11.45 a. m. on the same day. Dredging was commenced in Gayoso Crossing (104) at 1.15 p. m. August 17 and continued until the 19th.

The *Harrod* was moved down to Caruthersville (110) on August 20 and remained there till 9.45 a. m. September 4, when it returned to Gayoso Crossing (104). Dredging was commenced on September 5 at 4.15 p. m. and continued until 2.20 p. m. on the 6th, when a crack 12 inches in length was discovered in the second sheet from the after end of the starboard boiler of the starboard battery. Repairs were completed September 13, and on this date at 3.15 p. m. dredging was commenced. This work was completed at 11.15 p. m. on September 14, when the dredge was moved to the bank to await a lower stage.

At 7.30 a. m. September 17 the *Harrod* left Gayoso (104) for Point Pleasant (80). Dredging was commenced at 11.30 a. m. on the 18th. This work was continued until 10.30 p. m. on that date, when a crack was discovered in the middle boiler of the port battery in the second seam from the rear end. Dredging was suspended and the dredge moved to the bank at Point Pleasant for repairs. On September 19 instructions were given to attempt to continue dredging, using only two batteries of boilers. This was done on the 20th and the work was completed at 6.15 a. m. on the 22d.

At 10 a. m. on the 22d the dredge departed for Caruthersville (110), arriving there at 2.30 p. m. the same day. On arrival at Caruthersville preparations were made for repairing the cracked boiler shell. These repairs were completed on the 29th; and on the 30th at 8 a. m. the *Harrod* left Caruthersville for Morrissons Crossing (70) and arrived there at 11.45 a. m. October 2. Dredging was commenced at 8.15 p. m. on this date. This work was completed at 11 a. m. October 6.

The *Harrod* left the vicinity of Morrissons Crossing (70) on October 8 at 6.15 a. m. for Point Pleasant Crossing (80) and arrived there at 9 a. m. on the same date. Dredging was commenced at 9.30 a. m. on October 9 and was completed at 5.30 a. m. on the 15th, when the dredge was moved to the bank to await a lower stage and further instructions.

The *Harrod* left Point Pleasant (80) at 9.10 a. m. October 17 for Caruthersville (110) and arrived there at 1.10 p. m. on the same date.

The *Harrod* left Caruthersville (110) at 11.15 a. m. October 22 for, and arrived at. Gayoso Crossing (104) at 1 a. m. on the same day. Dredging was commenced in this crossing at 6 a. m. on the 23d and continued until 11.15 a. m. on the 25th, when the work projected, which was the enlargement of the lower end of the channel, was completed. The dredge was moved down above Caruthersville (110) to await a lower stage.

The *Harrod* remained at Caruthersville until 6.45 a. m. December 27, when it left for the dredge fleet (232). It arrived at the dredge fleet at 3.30 p. m. on December 28 and was withdrawn from commission on December 31.

Difficulty in securing firemen and dredge hands prevented the operation of the dredges as efficiently as they would have been otherwise. With high wages being paid at Army cantonments and in the cotton fields, it is very difficult to get men to go to or remain on the dredges. On this account it has been with considerable difficulty that the successful maintenance of the project has been accomplished.

Notes on conditions and results of dredging at each crossing during the low-water season of 1917.—During the low-water season of 1917 ten crossings were improved by dredging, namely: Morrissons (70), Point Pleasant (80). Gayoso (104), Blue Grass (132), River Styx (139), Chute of Island No. 30, foot (161), Drivers (169), foot of Cow Island (252), Fords (710), and Red River (766). In addition to the above, dredging was done to give access to Osceola Landing (165) and at head of Presidents Island (233) to open up a channel on the left of Presidents Island through Tennessee Chute.

Morrissons, 70 miles below Cairo.—This crossing gave little trouble and was dredged only once. The *Harrod* arrived there at 11.45 a. m. October 2, and after cleaning boilers commenced dredging at 8.15 p. m. on this date. The work was completed at 11 a. m. October 6. No further dredging was required.

Point Pleasant, 80 miles below Cairo.—The existing channel at this place had commenced to deteriorate when the river reached a comparatively low stage, about the middle of September, and it was deemed advisable to select a new location for the dredged channel. This was done with very satisfactory results and an excellent channel was maintained with two dredgings by the *Harrod.* A considerable amount of mud was encountered.

Gayoso, 104 miles below Cairo.—Gayoso was the most troublesome crossing encountered in the 1917 low-water season, on account of the necessity for locating the dredging axis at an angle with the direction of the current. This is always avoided whenever possible, but occasionally conditions arise, owing to the conformation of the river bottom, which leave very little choice in the selection of dredging axis.

This condition usually occurs when the current is parallel, or nearly parallel, to the contours of the reef. Since the dredge cuts must cross these contours, of necessity they must make an angle with them and consequently with the current. The result is that dredging must be repeated several times in a season to remove the material washed into the channel by the cross current.

It was necessary to dredge this crossing four different times, three times with the *Harrod* and once with the *Flad.* It was with considerable difficulty that project depth was maintained.

Blue Grass, 132 miles below Cairo.—While no great difficulty was experienced in maintaining a project channel through this crossing it was necessary to dredge it three times. It is possible that better results might have been obtained by locating the axis a little lower down for the first dredging, but this would have doubled, at least, the amount of excavation required. The advantage would have been in the greater possibility of not requiring additional work after the first channel had been completed.

River Styx, 139 miles below Cairo.—There was only one possible location for dredging work in this crossing and a very satisfactory channel was obtained by the *Flad.*

Chute of Island No. 30, foot, 161 miles below Cairo.—Only a small amount of dredging was required here. The *Iota* was moved into the crossing at foot, chute of Island No. 30, on October 15. Dredging was commenced on this date and completed at 4 p. m. October 18. No further dredging was required in this crossing during the remainder of the low-water season.

Drivers, 169 miles below Cairo.—At the beginning of the season there was considerable doubt as to whether the channel at this point would follow the course of previous years and cross the river to Flower Island or return to the Arkansas shore after making a slight detour around the bar below the foot of Bullerton Towhead.

The latter course was selected for improvement, and although a considerable amount of dredging was required, a very satisfactory channel of project depth was maintained through a shoal, which, without improvement, would have been a very serious obstacle to navigation.

In the first dredging in this crossing a wreck of a coal barge was encountered on the right-hand side of the channel, which prevented completion of the work as it was originally planned, making it necessary to do the widening which should have been done on this side, on the opposite side. An excellent channel was produced, however. This wreck was later partially removed by the snag boat *Macomb*.

Foot of Cow Island, 252 miles below Cairo.—The *Gamma* arrived in the crossing at 7.20 a. m. September 26 and dredging was commenced at 2.10 p. m. on that date. This work was completed at 12.30 p. m. October 4, when the dredge was moved to the bank to await a lower stage. No further dredging was required in this crossing.

Fords, 710 miles below Cairo.—The *Gamma* arrived at Fords Crossing on October 25. Dredging was commenced at 3.25 p. m. The work was completed, producing an excellent channel, at 12.30 p. m. October 30. No further dredging was necessary in this crossing.

Excellent results were obtained by the *Gamma* and a good project channel was maintained. Reports of shoal water in this crossing were refuted by a survey made October 25, which shows that the boats had been running too high.

Red River, 766 miles below Cairo.—Map made from survey of November 1–3 shows 8 feet as the best obtainable water through this crossing. Dredging by the *Gamma*, which was commenced on November 3 and completed on the 7th, produced an excellent channel, which required no further work during the remainder of the low-water season.

Dredge Depot at West Memphis, Ark.—Buildings and plant on land owned by the United States have been cared for and repaired and work incident to the care of a large fleet and its maintenance in a state of efficiency has been done.

Plant.—During the year the following plant, when not in operation, has been cared for at the fleet at West Memphis, Ark.:

Dredges *Beta, Gamma, Delta, Epsilon, Zeta, Iota, Kappa, Henry Flad,* and *B. M. Harrod*	9
Steamboats *Sachem, Choctaw, Leota, Inspector M. R. C., Mississippi, John Ewens, Saturn, Jupiter, Venus, Vulcan, Mercury,* and *Mars*	12
Pile sinkers *Nos. 13, 971, 981, 982,* and *983*	5
Derrick boat *M. R. C. No. 1*	1
Barges *Nos. 041* and *051*	2
Pump boat	1
Quarterboat *Wabash No. 3*	1
Gasoline launches	6
Calking flats	1
Sectional dock, sections	6

The *Inspector M. R. C., Saturn, Jupiter, Venus, John Ewens, Vulcan,* and *Mars* were used at different times as fleet tender during the lay-up season.

Buildings and grounds.—Buildings and grounds were cared for during the year.

Marine ways—Repairs.—Repairs were made during the year, and mud deposited by high water was removed from the gear pits and tracks.

OPERATION.

Ways in use	days	105
Ways idle	do	260
Dredge fleet boats docked		5
Plant of other engineer districts docked		1
Boats of private concerns docked		1

Character and number of craft handled:		
Dredges		5
Steamboats		2
Concrete mixers		1
Total tonnage handled	tons	4,351
Maximum load handled at any docking	do	1,270
Average load handled	do	271
Total cost of operation		$318.11
Total cost of repairs		3,799.29
Cost of docking per ton		.073
Cost of docking per ton, cost of repairs included		.947

Coal.—Eight barges of Baker lump coal, containing 4,200 tons, 14 barges of pea and slack containing 6,545.21 tons, and 14 barges of mine run containing 7,500 tons, were purchased from the West Kentucky Coal Co. under contract; 2,622.79 tons of coal were purchased at various places along the river by boats in transit.

The steamer *Mars* with pile sinker *No. 983* in tow, left the dredge fleet on June 20 for the United States coal harbor above Caruthersville, Mo. (110). The *Mars* returned to the dredge fleet on June 25. The first delivery of coal by the West Kentucky Coal Co. was made at the United States coal harbor on July 1.

At the close of the dredging season what loaded barges remained at the coal fleet were taken in tow by the dredge *B. M. Harrod* and brought to the dredge fleet, arriving there at 3.30 p. m. December 28. Pile sinker *No. 983* was also towed to the dredge fleet by the *Harrod.* The empty barges remaining at the coal fleet at the close of the dredging season were cared for at that place until taken in tow by the towboat *Reaper* on March 20.

The steamer *John Ewens* left the dredge fleet December 27 with loaded West Kentucky coal barge *No. 587* for the dredge *Gamma* at Red River and returned to the dredge fleet on January 10.

Subsistence.—All employees were furnished subsistence in kind. During the year 83,162 rations were served at a cost of 61.24 cents raw and 72.91 cents served, including wages of cooks, waiters, and all necessary labor in caring for quarters.

Inspection of floating plant.—The requirements of the Steamboat-Inspection Service are or will be fully complied with on all floating plant placed in commission for service

New plant.—No new plant was built during the year.

The expenditures during the year amounted to $319,959.26, all charged to maintenance.

Condition at end of fiscal year.—A navigable channel has been maintained since 1895, and a channel of project dimensions has been maintained since 1902, except as follows: For 18 days in 1903 and a few days in 1904 the depths at one bar were 8 and 8½ feet. For a few days there was less than 9 feet at five bars in 1908, seven bars in 1910, five bars in 1914, two bars in 1916, and one bar in 1917. At one bar in 1913 and four bars in 1916 the required width was not maintained.

The project depth of 9 feet with width of 250 feet was exceeded at all bars below Cairo at the end of the year.

The total expenditures to May 31, 1918, amount to $7,423,242.85.

Local cooperation.—None.

Effect of improvement.—Continuous navigation of the river below Cairo by river steamboats has been made possible.

Proposed operations.—It is proposed to operate as many units of dredging plant as may be necessary to fully maintain the project during the low-water season, to maintain the dredging plant in a state of efficiency, and make bar surveys in connection with dredging operations.

4. LEVEES: CAPE GIRARDEAU, MO., TO ROCK ISLAND, ILL.

Location and description.—The portion of the Mississippi River included in this section for levees extends over about 452 miles of river, from Cape Girardeau, Mo., 55 miles above Cairo, to near Rock Island, Ill., 507 miles above Cairo.

The district embraces 13 basins on the west bank of the river with an area of 546 square miles and a river frontage of 228 miles, and 9 basins on the east bank of the Mississippi River with an area of about 708 square miles and a river frontage of 270 miles.

Original condition.—The lands adjacent to the river on either side were subject to overflow at high water, the overflow extending from bluffs to bluffs. An area of about 980 square miles was partially protected from overflow by levees constructed by 42 local levee and drainage districts. Fourteen of these local districts, having an area of about 315 square miles with a river frontage of 96 miles, were located on the west bank of the river and 28 districts having an area of about 665 square miles with a river frontage of about 257 miles were located on the east bank. While the expenditures for levees by local districts prior to June 30, 1915, amounted to about $6,000,000, the levees were not adequate to control the floods that occur at intervals in this portion of the river.

Previous projects.—No comprehensive project for levees in this section had been adopted prior to March 4, 1913.

Levee work had been done at three localities previous to the existing project, with a total expenditure by the United States for construction, preservation, and repair of these levees as shown in the statement below:

Flint Creek to Iowa River (430 to 460[1] R.)	$346,325.54
Warsaw to Quincy (348 to 381[1] L.)	105,500.00
Sny Island Levee (282 to 335[1] L.)	106,728.99
	558,554.53

The funds used for work pertaining to these levees were provided by river and harbor acts of July 5, 1884, August 5, 1886, August 11, 1888, September 19, 1890, July 13, 1892, June 3, 1896, and June 13, 1902, and by sundry civil acts of March 2, 1895, and March 3, 1899.

Existing project.—The present project is to build or enlarge certain levees to a grade and section sufficient to protect adjacent lands from overflow. This project was adopted in 1913.

Above the mouth of the Missouri River the levees are to be built or enlarged to a section having a crown width of 6 feet with side slopes 1 on 3. The established grade is usually 3 feet above the highest known flood. Below the mouth of the Missouri River the levees are to be built to the standard section, crown width of 8 feet, river slope 1 on 3, land slope 1 on 3 to 8 feet below crown, thence a banquette 20 to 40 feet in width, with back slope 1 on 4.

The work has been successful in increasing the amount of protection afforded by the levees.

Operations and results during year—Rock Island to New Boston, Ill., (507 to 458[1]*).*—On May 21, 1918, proposals were opened for constructing 560,000 cubic yards of earthwork (350,000 cubic yards hydraulic fill in old borrow pits and 210,000 cubic yards levee enlargement) between stations 38 and 394 of the levee along the Mississippi River in the Drury drainage district, Illinois (485 to 477[1] L.). The contract was awarded to the La Crosse Dredging Co. at 18½ cents per cubic yard. Work under the contract had not commenced prior to May 31, 1918. The levee will be raised to a grade 4½ feet above the high water of 1916.

Muscatine to mouth of Iowa River, Iowa (481 to 460[1]*).*—On July 19, 1917, a contract was entered into with the S. R. H. Robinson & Son Contracting Co. for 160,000 cubic yards of earthwork, reconstructing the Muscatine Island Levee from station 142+50 to station 317, at 15.95 cents per cubic yard. Under this contract 38,378 cubic yards had been placed prior to May 31, 1918.

On May 13, 1918, a contract was entered into with H. G. Armstrong for 250,000 cubic yards of earthwork, reconstructing the Muscatine Island Levee between stations 317 and 535. Work under the Armstrong contract had not commenced prior to May 31, 1918.

The Muscatine Island Levee is about 12 miles in length, extending from the lower limits of the city of Muscatine downstream along the bank of the Mississippi River to Port Louisa, Iowa. At Port Louisa a junction is formed with the levee in Louisa County levee district No. 15, making a continuous levee from Muscatine to the mouth of the Iowa River. The levee in this district is being built to a grade 4½ feet above the high water of 1916.

Warsaw to Quincy, Ill. (381 to 348[1]*).*—Under the contract with Cameron, Joyce & Co., dated September 22, 1914, for enlargement work between stations 0 and 164 of the Hunt Levee (380 to 377[1] L.) a total of 21,856 cubic yards was placed during the year, completing the contract. The total cost of this contract was $24,876.67.

---

[1] Miles above Cairo.

On August 29, 1917, a contract was entered into with Cameron, Joyce & Co., for the reconstruction of 95,020 cubic yards of levee embankment between station 164 and station 210 of the Hunt Levee (377 to 376[1] L.) at 28½ cents per cubic yard. This contract was completed at a total cost of $27,478.55.

On June 3, 1918, proposals were invited by advertisement for continuing the enlargement and reconstruction of the Hunt Levee from station 210 to station 570, the lower limit of the Hunt drainage district. This work will be accomplished by the expenditure of an allotment of $55,000 from flood-control funds carried by the sundry civil act of June 12, 1917, and $27,500 contributed by the Hunt drainage district.

Oquawka to Dallas, Ill. (441 to 414[1]*).*—Under the allotment of $20,000, for levees in this locality from the funds carried by the river and harbor act of July 27, 1916, proposals for construction of earthwork for enlarging a part of the levee along the Mississippi River in Henderson County drainage district No. 1, Illinois, were invited three times by advertisement but no bids were received.

Mouth of Des Moines River to La Grange, Mo. (381 to 356[1]*).*—Fourteen thousand four hundred dollars from the allotment of $20,000 for levees in this locality from flood-control funds carried by the sundry civil act of June 12, 1917, and $7,200 contributed by the Gregory drainage district, Missouri, are being expended in reconstructing the levee along the Mississippi River in the Gregory drainage district, Missouri, from station 0 to station 39. On October 31, 1917, a contract was entered into with Cameron, Joyce & Co., for the construction of 47,317 cubic yards of earthwork at 43 cents per cubic yard. Under this contract 46,192 cubic yards had been placed prior to May 31, 1918.

The Gregory drainage district embraces 8,000 acres of land in the basin between Fox River and the bluffs above Canton, Mo. (375 to 369[1] R.). The levee in the district along the Mississippi River is about 6 miles in length and will be raised to a grade 3 feet above the high water of 1851.

Quincy to Hamburg Bay, Ill. (348 to 282[1]*).*—On September 17, 1914, a contract was entered into with the Bondurant Construction Co. for 132,900 cubic yards of earthwork between stations —18 and 482 of the Sny Levee (335 to 326[1] L.) at 32½ cents per cubic yard. This contract was annulled during the fiscal year ending June 30, 1917, and work was continued by the United States with hired teams. During the year a total of 52,879 cubic yards was placed at a cost of $24,983.44, approximately 47 cents per cubic yard. An additional 6,347 cubic yards will be required to complete the work contemplated under the Bondurant contract.

On April 22, 1918, proposals were invited by advertisement for the construction of 350,000 cubic yards of earthwork between stations 380 and 740 of the Sny Levee (328 to 322[1] L.) but no proposals were received in response to the advertisement.

La Grange to Mouth of Missouri River, Mo. (357 to 208[1]*)*—The contract with Fred C. Morgan for earthwork on the Riverland Levee unfinished at the end of the previous year, was completed. A total of 107,091 cubic yards was placed under this contract during the year, at a cost to the United States of $16,084.16. The total cost of this contract was $19,985.85.

On October 19, 1917, a contract was entered into with the S. R. H. Robinson & Son Contracting Co. for 560,000 cubic yards of earthwork between stations 82 and 395 of the Riverland Levee (311 to 305[1] R.) at 15 cents per cubic yard. A total of 51,180 cubic yards had been placed under this contract prior to May 31, 1918. The levee is being raised to a grade 3 feet above the high water of 1851.

This work is being accomplished by the expenditure of $66,000 from the allotment of $70,000 for levees in this locality from flood-control funds carried by the sundry civil act of June 12, 1917, and $33,000 contributed by the Riverland levee district.

Head of Chouteau Island to Prairie du Pont, Ill. (208 to 185[1]*).*—The work of closing a gap between stations 886 and 895 of the front levee in the East Side levee and sanitary district, Ill., under contract with the Hillsboro Dredging Co. and unfinished at the end of the previous year, was completed on September 29, 1917. A total of 34,824 cubic yards was placed during the year at a cost of $13,100.01 to the United States. The total cost of this contract was $13,900. The front levee in this district is now completed to the project grade and section.

---

[1] Miles above Cairo.

After completion of the levee work the unexpended balance of $11,100 was reallotted as follows:

Levees:

Muscatine to mouth of Iowa River, Iowa	$5,500
Warsaw to Quincy, Ill	5,600

St. Louis to Cape Girardeau, Mo. (*191 to 54*[1]).—The allotment of $50,000 for levees in this locality from flood-control funds carried by the sundry civil act of June 12, 1917, was realloted to levees as follows:

Grand Tower to Gale, Ill. (84 to 48[1])	$25,000
Warsaw to Quincy, Ill. (380 to 348[1])	25,000

Prairie du Pont to Grand Tower, Ill. (*185 to 84*[1]).—The allotment of $55,000 for levees in this locality from flood-control funds carried by the sundry civil act of June 12, 1917, was reallotted to levees, Rock Island to New Boston, Ill. (510 to 460[1]).

Grand Tower to Gale, Ill. (*84 to 48*[1]).—Levee reconstruction between stations 69 and 181 of the East Cape Girardeau Levee (57 to 60[1] L.) unfinished at the end of the previous year, was completed. A total of 59,699 cubic yards was placed during the year, under this contract, at a cost of $10,074.31. The total cost of this contract was $14,417.47.

On November 23, 1917, a contract was entered into with McCann Bros. for 20,000 cubic yards of earthwork between stations 179 and 202 of the East Cape Girardeau Levee (57[1] L.) at 24 cents per cubic yard. Work under this contract commenced on May 16, 1918, and a total of 1,628 cubic yards had been placed prior to May 31, 1918.

On April 8, 1918, a contract was entered into with Cameron, Joyce & Co. for 100,000 cubic yards of earthwork between stations 202 and 330, of the East Cape Girardeau Levee, at 29½ cents per cubic yard. Work under this contract commenced on May 18, 1918, and 7,936 cubic yards had been placed prior to May 31, 1918. Funds for continuing the reconstruction and enlargement of the East Cape Girardeau Levee downstream from station 202 are provided by the allotment of $25,000 from flood-control funds, the transfer of $25,000 from levees, St. Louis to Cape Girardeau, to levees in this locality and $25,000 contributed by the East Cape Girardeau and Clear Creek drainage district.

The expenditures on levees during the year June 1, 1917, to May 31, 1918, are summarized in the following table:

Locality.	Miles above Cairo.	Amount expended.
Drury drainage district, Ill	485 to 477	$247.42
Muscatine Island levee district, Iowa	481 to 460	5,082.62
Henderson County drainage district No. 1, Ill	428 to 436	262.04
Hunt drainage district, Ill	380 to 369	34,192.67
Gregory drainage district, Mo	375 to 369	12,494.93
Sny Island levee drainage district, Ill	335 to 282	25,295.88
Riverland levee district, Mo	312 to 305	21,397.44
East Side levee and sanitary district, Ill	208 to 185	13,440.71
East Cape Girardeau and Clear Creek drainage district, Ill	61 to 48	12,502.35
Total		124,916.06

For abstract of contracts in force see page 3539.

Condition at the end of the fiscal year.—For complete report on examination of this district by the Mississippi River Commission with recommendations, see H. R. Doc. 628, Sixty-third Congress, second session.

A total of 1,160,000 cubic yards of earthwork have been placed. Two million seven hundred and twenty-five thousand cubic yards are still required to complete the work under approved subprojects. Twenty-four miles of levee embankment have been completed to the commission grade and section. The total expenditures by the United States under the project to May 31, 1918, are summarized in the following statement:

Drury drainage district, Ill	$510.26
Muscatine Island levee district, Iowa	5,555.61
Henderson County drainage district No. 1, Ill	907.40

---

[1] Miles above Cairo.

Hunt drainage district, Ill	$52,339.61
Gregory drainage district, Mo	12,494.93
Sny Island levee drainage district, Ill	50,066.82
Elsberry drainage district, Mo	37,753.81
Riverland levee district, Mo	21,732.49
East Side levee and sanitary district, Ill	73,900.00
East Cape Girardeau and Clear Creek drainage district, Ill	24,522.49
Total	279,783.42

Local cooperation.—The expenditures for levees by local levee boards in localities where expenditures have been made or proposed by the United States under this project are shown by the following statement:

Drury drainage district, Ill	$156,913.79
Muscatine Island levee district, Iowa	76,471.14
Henderson County drainage district No. 1, Ill	116,812.99
Hunt drainage district, Ill	272,800.00
Gregory drainage district, Mo	92,091.70
Sny Island levee drainage district, Ill	1,517,911.77
Riverland levee district, Mo	56,186.34
Elsberry drainage district, Mo	233,141.65
East Side levee and sanitary district, Ill	3,335,641.97
East Cape Girardeau and Clear Creek drainage district, Ill	144,778.30
Total	6,002,749.65

In addition to the expenditures tabulated above, contributions of funds for flood control have been made during the fiscal year as follows:

Drury drainage district, Ill	$27,500.00
Muscatine Island levee district, Iowa,	15,000.00
Hunt drainage district, Ill	27,500.00
Gregory drainage district, Mo	7,200.00
Riverland levee district, Mo	33,000.00
East Cape Girardeau and Clear Creek drainage district, Ill	25,000.00
Total	135,200.00

Effect of improvement.—Added protection against overflow has been given to about 222,000 acres of land.

Proposed operations.—Continuation of the enlargement and reconstruction of levees at the rate that funds made available will permit. Expenditures under existing contracts, during the season when river and weather conditions will permit work, will be at the rate of $50,000 per month until January 1, 1919, and $30,000 per month from January 1 to June 30, 1919. An additional $10,000 per month will be expended on contracts being advertised but not yet awarded, or by accomplishing levee enlargement in the Sny Island levee drainage district and in Henderson County drainage district No. 1 by hired plant and labor.

The following papers and plates accompany this report:

Money statements.

Abstract of contracts in force.

Commercial statistics.

Statement of charts issued and sold.

Table No. 1. Highest and lowest gauge readings in 1917, Mississippi River and tributaries.

Table No. 2. Highest gauge readings of 1918, Mississippi River and tributaries.

Table No. 3. Results of discharge observations, Mississippi River and tributaries.

Table No. 4. Cost of dredging operations, May 1, 1917, to April 30, 1918.

Table No. 5. Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1917.

Table No. 6. Dimensions of channels through bars, Mississippi River below Cairo, dredging season of 1917.

Table No. 7. Summary of dredging operations, Mississippi River below Cairo during the low-water season of 1917.

Plate No. 1. Hydrograph of Mississippi River, Cairo, Ill., to Fort Jackson, La., June 1, 1917, to May 31, 1918.

Plate No. 2. Profile of Drury Levee.

Plate No. 3. Profile of Muscatine Island Levee.

Plate No. 4. Profile of levee in Henderson County drainage districts Nos. 1 and 2, Illinois.

Plate No. 5. Profile of Hunt and Lima Lake Levee.

Plate No. 6. Profile of Gregory Levee.

Plate No. 7. Profile of Sny Island Levee.

Plate No. 8. Profile of Riverland levee.

Plate No. 9. Profile of Front Levee, East Side Levee, and sanitary district.

Plate No. 10. Profile of East Cape Girardeau Levee.

Plate No. 11. Location of levee work, Rock Island to Nauvoo.

Plate No. 12. Location of levee work, Nauvoo to Alton.

Plate No. 13. Location of levee work, Alton to Thebes.

Appendix 1A. Laws affecting the Mississippi River Commission July 1, 1917, to June 30, 1918.

E. J. Thomas,
Assistant Engineer, Secretary Mississippi River Commission.

MONEY STATEMENTS.

APPROPRIATION FOR MISSISSIPPI RIVER.

July 1, 1917, balance unexpended		[1] $478,169.89
Amount received from sale of coal credited under the provisions of section 5 of river and harbor act of June 13, 1902, in June, 1918, to allotment for "Dredges and dredging"	$271.19	
Amount received in December, 1917, for rental of steamboat *Nokomis* (ED 114290-3, Sec. MRC 2438-11) credited to allotment for "Dredges and dredging"	1,220.00	
Amount received in January, 1918, for rental of steamboats *Nokomis* and *Sachem* (ED 114290-3, Sec. MRC 2438-11) credited to allotment for "Dredges and dredging"	2,260.00	
Amount received in April, 1918, for rental of steamboat *Leota* (Sec. MRC. 2557-12) credited to allotment for "Dredges and dredging"	805.00	
Amount received in May, 1918, for rental of steamboat *Leota* (ED 93650-23, Sec. MRC. 2557-12) credited to allotment for "Dredges and dredging"	910.00	
Amount received in May, 1918, for docking steamer *Eclipse* (ED 78130-29, Sec. MRC 2045-29) credited to allotment for "Dredges and dredging"	842.90	
Amount received in May, 1918, from collection of stoppage against pay of a United States employee for destruction of public property, credited to allotment for "Dredges and dredging"	19.33	

---

[1] The amount, $476,423.58, reported in annual report for 1917, has been increased $1,746.31, as follows:

Increased by refundments—		
November, 1917, voucher 151, March, 1917 (to surveys, gages and observations)	$1.15	
November, 1917, vouchers 1 and 4, March, 1917 (to dredges and dredging)	16.01	
		$17.16
Increased by reimbursement from St. Louis district office for coal, credited to allotment for "dredges and dredging" (ED 104197-723)		451.28
Increased by reimbursement from U. S. Engineer office, Little Rock, Ark., for repairs to dredge *H. S. Taber*, credited to allotment for "dredges and dredging (ED 104197-1610)		1,277.87
		1,746.31

Amount received in June, 1918, for rental or dredge *Delta*, steamboats *Leota* and *Saturn* and pilesinker *No. 983* (ED 104197-2251, Sec. MRC 1615-70) credited to allotment for "Dredges and dredging"	$3, 628. 76	
		$9, 957. 18
		488, 127. 07
June 30, 1918, amount expended during fiscal year		290, 662. 20
July 1, 1918, balance unexpended		197, 464. 87
July 1, 1918, outstanding liabilities	4, 056. 98	
July 1, 1918, amount covered by uncompleted contracts	57, 325. 44	
		61, 382. 42
July 1, 1918, balance available		136, 082. 45

APPROPRIATION FOR MAINTENANCE AND IMPROVEMENT OF EXISTING RIVER AND HARBOR WORKS.

July 1, 1917, balance unexpended	[1] $111, 489. 75
Amount transferred in May, 1918, to allotment "Upper St. Francis levee district" first and second Mississippi River Commission districts, by resolution of the Mississippi River Commission, April 6, 1918, approved by the Chief of Engineers April 15, 1918. (ED 15927-576.) (Act of Oct. 2 1914, $1,637.28; act of Mar. 4, 1915, $109,852.47)	111, 489. 75

APPROPRIATION FOR FLOOD CONTROL, MISSISSIPPI RIVER, AND SACRAMENTO RIVER, CAL.

July 1, 1917, balance unexpended		$0. 00
Amount allotted from appropriation by sundry civil act of June 12, 1917, approved by the Chief of Engineers, Aug. 7, 1917 ("Mississippi River Commission," $50,000; "Surveys, gauges, and observations," $40 000; "Dredges and dredging," $350,00; "New steamer," $196,000; "Levees, Cape Girardeau, Mo., to Rock Island, Ill.," $280,000)	$916, 000. 00	
		916, 000. 00
June 30, 1918, amount expended during fiscal year		235, 486. 92
July 1, 1918, balance unexpended		680, 513. 08
July 1, 1918 outstanding liabilities	107, 604. 39	
July 1, 1918, amount covered by uncompleted contracts	144, 617. 84	
		252, 222. 23
July 1, 1918, balance available		428 290. 85

APPROPRIATION FOR GAUGING WATERS OF THE MISSISSIPPI RIVER AND ITS TRIBUTARIES.[2]

July 1, 1917, balance unexpended	[3] $1, 776. 36
Amount allotted by Chief of Engineers, from permanent annual appropriation made by section 6 of river and harbor act of Aug. 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902	9, 100. 00
	10, 876. 36

---

[1] The amount, $111,489.66, reported in annual report for 1917, has been increased $0.09 by refundment of overpayment November, 1917, on voucher 86, January, 1917, credited to allotment for "dredges and dredging."

[2] The custody and care of the gauges maintained under this appropriation were assumed by the Mississippi River Commission Feb. 11, 1901, on which date they were transferred to the secretary, under authority of Secretary of War, dated Jan. 25, 1901.

[3] The amount, $1,771.69, reported in annual report for 1917, has been increased $4.67 by the secretary, by refundment of overpayment on voucher 107, June, 1917.

June 30, 1918, amount expended during fiscal year	$8,217.85	
June 30, 1918, amount reverted to Treasury during fiscal year	860.84	
		$9,078.69
July 1, 1918, balance unexpended		1,797.67
July 1, 1918, outstanding liabilities		1,797.67
Amount that can be profitably expended in fiscal year ending June 30, 1920		9,100.00

ITEMIZED STATEMENT OF EXPENDITURES DURING THE FISCAL YEAR ENDING JUNE 30, 1918, SUBMITTED IN COMPLIANCE WITH REQUIREMENT OF SECTION 6 OF RIVER AND HARBOR ACT OF AUG. 11, 1888.

Observations:		
Pay of permanent gauge observers		$3,548.00
Inspections and repairs:		
Inspection of gauges on Mississippi River by junior engineers and parties on steamers	$1,877.93	
Inspection of gauges on tributaries	109.41	
Renewals and repairs of gauges and bulletins	93.70	
		2,081.04
Office expenses and contingencies:		
Pay of assistant and junior engineers, surveyors, and clerks	1,980.23	
Stationery, printing, office rent, etc	608.58	
		2,588.81
Total		8,217.85

APPROPRIATION FOR GAUGING THE WATERS OF THE MISSISSIPPI RIVER AND ITS TRIBUTARIES.

Allotments from general appropriations for examinations, surveys, and contingencies of rivers and harbors by acts of—	
Mar. 3, 1871 (allotment Apr. 11, 1871)	$5,000.00
June 10, 1872 (allotment July 11, 1872)	5,000.00
Mar. 3, 1873 (allotment May 17, 1873)	5,000.00
June 23, 1874 (allotment July 29, 1874)	5,000.00
Mar. 3, 1875 (allotment Mar. 22, 1875)	5,000.00
Specific appropriations by river and harbor acts of—	
Aug. 14, 1876	5,000.00
June 18, 1878	5,000.00
Mar. 3, 1879	5,000.00
June 14, 1880	5,000.00
Mar. 3, 1881	5,000.00
Aug. 2, 1882	5,000.00
Deficiency act of Mar. 12, 1884	2,100.00
Specific appropriations by river and harbor acts of—	
July 5, 1884	5,000.00
Aug. 5, 1886	5,000.00
Allotted from specific appropriation by river and harbor act of Aug. 11, 1888 (allotment Oct. 17, 1888)	8,700.00
Deficiency act of Oct. 19, 1888	3,600.00
Allotments from permanent indefinite appropriation made by section 6 of river and harbor act of Aug. 11, 1888, for fiscal years, viz:	
1890 (allotment Aug. 23, 1889)	9,000.00
1891 (allotment Aug. 19, 1890, $8,700, less $3,518.34 withheld in United States Treasury under ruling that only $6,000 can be expended each fiscal year)	5,181.66
1892 (allotment July 17, 1891)	5,100.00
1893 (allotment July 15, 1892)	5,500.00
1894 (allotment July 18, 1893)	5,500.00
1895 (allotment June 5, 1894)	5,500.00
1896 (allotment June 4, 1895)	5,500.00

1897 (allotment May 13, 1896)	$,500.00
1898 (allotment June 16, 1897)	5,500.00
1899 (allotments May 27, 1898, $5,500; July 12, 1898, $500.00)	6,000.00
1900 (allotment June 1, 1899)	5,500.00
1901 (allotment July 2, 1900)	6,000.00
1902 (allotment July 31, 1901)	6,000.00
Allotments from permanent annual appropriation made by section 6 of river and harbor act of Aug. 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902, for fiscal years, viz:	
1903 (allotment July 23, 1902, $9,600, less $500 allotted Aug. 2, 1902, to St. Paul, Minn., district)	9,100.00
1904 (allotment Apr. 18, 1903)	9,100.00
1905 (allotment Aug. 11, 1904)	9,100.00
1906 (allotment June 30, 1905)	9,100.00
1907 (allotment July 2, 1906)	9,100.00
1908 (allotment July 24, 1907)	9,100.00
1909 (allotment July 3, 1908)	9,100.00
1910 (allotment July 13, 1909)	9,100.00
1911 (allotment July 27, 1910)	9,600.00
1912 (allotment Feb. 7, 1911)	9,100.00
1913 (allotment May 29, 1912)	9,100.00
1914	9,100.00
1915 (allotment Sept. 2, 1914)	9,100.00
1916 (allotment July 28, 1915)	9,100.00
1917 (allotment Aug. 3, 1916)	9,100.00
1918 (allotment June 27, 1917)	9,100.00
Total	301,281.66

Expended.

	To June 30, 1917.	During year ending June 30, 1918.	Total.
Expenditures	[1] $272,306.36	$8,217.85	$280,524.21
Unexpended balances reverted to Treasury	18,098.94	860.84	18,959.78
Total	290,405.30	9,078.69	299,483.99
Unexpended balance June 30, 1918			1,797.67
Total appropriated, etc			301,281.66

[1] The amount $272,312.08, reported in annual report for 1917, has been decreased $5.72 by refundments for overpayment by the Secretary and to correct clerical error, as follows:

July, 1917, voucher 107, June, 1917	$4.67
To correct clerical error	1.05
	5.72

FUNDS CONTRIBUTED BY LOCAL LEVEE DISTRICTS FOR FLOOD CONTROL, MISSISSIPPI RIVER, IN ACCORDANCE WITH SUNDRY CIVIL ACT, JUNE 12, 1917.

For levees, Cape Girardeau, Mo., to Rock Island, Ill		135,200.00
June 30, 1918, amount expended during fiscal year		8,664.50
July 1, 1918, balance unexpended		126,535.50
July 1, 1918, outstanding liabilities	$2,920.39	
July 1, 1918, amount covered by uncompleted contracts	72,269.23	
		75,189.62
July 1, 1918, balance available		51,345.88

APPROPRIATION FOR WATERWAY FROM LOCKPORT, ILL., TO ST. LOUIS, MO.

Act of June 13, 1902 (river and harbor)		25,000.00
Amount transferred from allotment for "Survey of Illinois and Des Plaines Rivers, Ill.," as reimbursement		1,093.40
Total		26,093.40
Expended to June 30, 1906	$22,291.23	
Unexpended balance carried to surplus fund on June 30, 1909, under the provisions of section 10 of sundry civil act of Mar. 4, 1909	3,802.17	
		26,093.40

APPROPRIATION FOR CLAIMS FOR DAMAGES BY COLLISION, RIVER AND HARBOR WORKS.

Act of Apr. 6, 1914 (urgent deficiency)	58.84
Expended in fiscal year 1914	58.84
Act of Sept. 8, 1916 (general deficiency)	427.30
Expended in fiscal year 1917	427.30

Abstract of contracts in force during fiscal year ending June 30, 1918—Improving Mississippi River, Mississippi River Commission, Secretary's office.

Contractor.	Character of work and locality.	Cubic yards in contract.	Price.	Date of contract.	Date of approval.	Date of beginning work.	Date of expiration.	Percentage of completion.
Combustion Engineering Corporation.	Mechanical stokers on dredge B. M. Harrod.		$9,150	Apr. 7, 1916	May 3, 1916	May 16, 1916	Oct. 12, 1916[1]	[2] 100
	Mechanical stokers on dredge Henry Flad.		$6,850					[2] 100
International Building Co.	Lease of offices and storage rooms		$6,724 per annum	June 28, 1917	Emergency	July 1, 1917	June 30, 1918	100
Southwestern Bell Telephone Co.	Telephone service		$96 per annum	June 29, 1917	do	do	do	100
	Two extension telephone desk sets		$36 per annum	do	do	do	do	100
	Cut-out switch		$2 per annum	do	do	do	do	100
	One extension telephone desk set		$18 per annum	July 23, 1917	do	July 25, 1917	do	100
Cumberland Telephone & Telegraph Co.	Telephone service at West Memphis, Ark.		$78 per annum	June 29, 1917	do	July 1, 1917	do	100
Loyd W. Lang, trustee	Lease of water-front privileges at West Memphis, Ark.		$150 per annum	June 23, 1917	do	do	do	100
Chas. W. Hunter	do		$100 per annum	do	do	do	do	100
West Kentucky Coal Co.	3,500 tons screened lump coal		$4.05 per ton	Mar. 15, 1917	May 4, 1917	May 10, 1917	do	[3] 100
	6,250 tons mine run coal		$3.20 per ton	do	do	do	do	[3] 100
	4,000 tons pea and slack coal		$3.20 per ton	do	do	do	do	[3] 100
A. Hoen & Co.	31,500 detail charts		$18 per 100 sheets	Jan. 17, 1917	Feb. 7, 1917	Feb. 14, 1917	Aug. 14, 1917[1]	25
	3,000 detail charts		$35 per 100 sheets	do	do	do	do	25
	11,500 inch-mile maps		$10 per 100 sheets	do	do	do	do	25
	600 inch-mile maps		$12 per 100 sheets	do	do	do	do	25
Cameron, Joyce & Co.	Levee work, Hunt drainage district, Ill.	96,274	20.50 cents per cubic yard.	Sept. 22, 1914	Oct. 15, 1914	Oct. 27, 1914	Dec. 31, 1915[1]	[4] 100
	do	95,020	28.50 cents per cubic yard.	Aug. 29, 1917	Sept. 21, 1917	Aug. 27, 1917	Dec. 31, 1918	[5] 100
Fred C. Morgan	Levee work, Riverland levee district, Mo.	115,998	16 cents per cubic yard.	May 11, 1917	May 31, 1917	May 18, 1917	Dec. 31, 1917	[6] 100
Hillsboro Dredging Co.	Levee work, East Side levee and sanitary district, Ill.	34,824	35.25 cents per cubic yard.	Jan. 17, 1917	Feb. 12, 1917	Feb. 19, 1917	do	[7] 100
Roach & Stansell	Levee work, East Cape Girardeau and Clear Creek drainage district, Ill.	83,000	15.38 cents per cubic yard.	Dec. 29, 1916	Jan. 25, 1917	Feb. 2, 1917	do	[8] 100
La Crosse Dredging Co.	Levee work, Drury drainage district, Ill.	495,000	18.50 cents per cubic yard.	June 6, 1918	June 26, 1918	(9)	June 30, 1919	
S. R. H. Robinson & Son	Levee work, Muscatine Island levee district, Iowa.	197,000	15.95 cents per cubic yard.	July 19, 1917	July 31, 1917	Sept. 11, 1917	Dec. 31, 1918	21.5
W. G. Armstrong	do	250,000	15.75 cents per cubic yard.	May 13, 1918	June 8, 1918	(9)	June 30, 1919	

[1] Time limit waived.
[2] Completed June 30, 1917.
[3] Completed Dec. 27, 1917.
[4] Completed Mar. 20, 1918.
[5] Completed Apr. 29, 1918.
[6] Completed Sept. 27, 1917.
[7] Completed Sept. 29, 1917.
[8] Completed Oct. 4, 1917.
[9] Work not commenced.

Abstract of contracts in force during fiscal year ending June 30, 1918. Improving Mississippi River, Mississippi River Commission, Secretary's office—Continued.

Contractor.	Character of work and locality.	Cubic yards in contract.	Price.	Date of contract.	Date of approval.	Date of beginning work.	Date of expiration.	Percentage of completion.
Cameron, Joyce & Co	Levee work, Gregory drainage district, Mo.	47,317	43 cents per cubic yard.	Oct. 31, 1917	Dec. 14, 1917	Nov. 6, 1917	Dec. 31, 1918	97.6
S. R. H. Robinson & Son	Levee work, Riverland levee district, Mo.	560,000	15 cents per cubic yard.	Oct. 19, 1917	Dec. 11, 1917	Apr. 1, 1918	do	12.4
McCann Bros	Levee work, East Cape Girardeau and Clear Creek drainage district, Ill.	20,000	24 cents per cubic yard.	Nov. 23, 1917	Dec. 19, 1917	May 16, 1918	do	14.4
Cameron, Joyce & Co	do	100,000	29.50 cents per cubic yard.	Apr. 8, 1918	May 15, 1918	May 18, 1918	do	29.4

TABLE No. 1.—*Commercial statistics for calendar year 1917.*

Tonnage between—	Number of passengers.	Receipts and shipments, in tons.					
		Grain and its products.	Cotton.	Cotton-seed and its products	Live stock.	Coal and coke.	Lumber.
St. Louis and Cairo [1]	67,666	7,586	907	1,415	5,608	15,183	7,357
Cairo and Memphis [3]	83,742	5,064	6,370	4,175	2,439	220,811	30,410
Memphis and Vicksburg [4]	41,940	9,314	14,661	9,827	7,031	129,847	29,652
Vicksburg and New Orleans [5]	18,036	5,247	13,193	5,865	2,353	269,568	40,517

Tonnage between—	Logs.	Receipts and shipments, in tons.					
		Iron, steel, and metals.	Groceries and provisions.	Stone, gravel, and sand.	Oil.	Unclassified and miscellaneous.	Total.
St. Louis and Cairo [1]	28,664	60,584	6,256	[2] 127,254	8,143	95,820	364,777
Cairo and Memphis [3]	195,152	55,052	8,967	70,089	5,305	31,610	635,444
Memphis and Vicksburg [4]	208,821	58,803	13,389	932,612	5,745	73,838	1,493,540
Vicksburg and New Orleans [5]	238,245	1,249	46,237	247,478	1,515,115	164,587	2,549,654

NOTE.—Each stretch is treated as a separate river, and tonnage carried between ports on different stretches will appear in the statistics of all intervening stretches; consequently the sum of the tonnage carried in the four stretches does not represent the total traffic on the river as a whole.

[1] Includes 14,126 tons coal, 100 tons logs, 150 tons groceries, 38,929 tons stone and gravel, 3,195 tons miscellaneous handled by Government vessels.

[2] Does not include 675,682 tons of sand and gravel barged in vicinity of St. Louis.

[3] Includes 21,451 tons stone and gravel handled by Government vessels.

[4] Includes 217 tons grain and its products, 466 tons live stock, 5,415 tons coal and coke, 716 tons iron and steel, 310 tons groceries and provisions, 94,762 tons stone and gravel, 8 tons oil, and 54,900 tons miscellaneous handled by Government vessels.

[5] Includes 78 tons live stock, 510 tons coal and coke, 30 tons iron and steel, 950 tons stone, gravel, and sand, and 4,300 tons miscellaneous handled by Government vessels.

TABLE No. 2.—*Receipts and shipments at principal ports.*

Port.	Passengers carried in and out of port.	Receipts and shipments in tons.					
		Grain and its products.	Cotton.	Cotton seed and its products.	Live stock.	Coal and coke.	Lumber.
St. Louis, Mo.[1]	506,782	7,625	907	1,415	10,596	32,587	8,088
Memphis, Tenn.[2]	137,420	5,919	14,672	4,004	3,229	141,905	1,624
Vicksburg, Miss.[3]	138	251	36	113	388	3,173	11,792
New Orleans, La.[4]	34,225	1,558,623	259,382	24,505	6,748	159,584	439,765

Port.	Receipts and shipments in tons.						
	Logs.	Iron, steel, and metals.	Groceries and provisions.	Stone, gravel, and sand.	Oil.	Unclassified and miscellaneous.	Total.
St. Louis, Mo.[1]	22,100	58,569	11,638	693,066	105	128,429	975,125
Memphis, Tenn.[2]	87,869	2,615	7,999	294,040	523	11,593	575,992
Vicksburg, Miss.[3]	63,771	751	685	12,200	10	7,076	100,246
New Orleans, La.[4]	440,328	924,207	1,494,411	37,423	2,407,754	989,573	8,742,303

[1] Includes 443,051 passengers in local excursion traffic.

[2] Includes 124,475 passengers in local excursion traffic and 930 tons stone and gravel handled by Government vessels.

[3] Includes 167 tons grain and its products, 388 tons live stock, 763 tons coal and coke, 291 tons lumber, 746 tons iron, 310 tons groceries, 8 tons oil, 7,100 tons stone and gravel, and 5,600 tons miscellaneous handled by Government vessels.

[4] Includes exports, imports, and the domestic coastwise traffic as far as reported; also 8,881 tons coal and coke, 9,181 tons lumber, 600 tons groceries and provisions, 800 tons oil, 77,023 tons stone, gravel and sand, and 64,902 tons miscellaneous handled by Government vessels.

TABLE No. 3.—*Seagoing traffic at New Orleans, La.*

Arrivals and departures.	Number.	Tonnage.	Passengers.
Foreign-bound vessels	1,609	3,013,688	22,157
Coastwise vessels	426	851,787	6,592
Total	2,035	3,865,475	28,749

Receipts and shipments.	Tons.
Grain and its products	1,555,012
Cotton	252,914
Cotton seed and its products	20,304
Live stock	4,658
Lumber	406,243
Logs	312,928
Iron, steel, and metals	922,427
Groceries and provisions	1,449,503
Oils	2,340,598
Stone, gravel, and sand	14,703
Miscellaneous and unclassified	902,386
Total	8,181,676

TABLE No. 4.—*Ferry traffic.*

Location of ferries and transfers.	Number of passengers.	Tonnage of freight carried.					
		Grain and its products.	Cotton.	Cotton seed and its products.	Live stock.	Coal and coke.	Lumber.
At St. Louis, Mo	375,043	229,000	600	9,125	3,450	2,060,000	266,000
At Little Rock, Mo., Commerce, Mo., and Cape Girardeau, Mo	36,166	765	....	....	558	629,390	637
At Cairo, Ill., to Birds Point, Mo., and Wickliffe, Ky., and Richardson, Tenn	188,954	137	....	....	720	....	98
At Memphis, Tenn., to Mound City, Ark., and West Memphis, Ark	81,822	200	664	804	2,984	15	208
At Helena, Ark., to Trotters Point, Miss	119,385	5,254	1,766	4,574	1,009	165,168	70,695
At Vicksburg, Miss., to Delta Point, La	155,256	16,859	219	260	2,236	126,914	11,328
At Natchez, Miss., Vidalia, La., Baton Rouge, La., Bayou Sara, La., Plaquemine, La., Anchorage, La	220,944	180,412	64,048	8,592	8,412	69,134	143,661
At New Orleans, La	5,646,699	340,855	101,343	22,200	15,594	184,928	218,788

Location of ferries and transfers.	Tonnage of freight carried.						
	Logs.	Iron, steel, and metals.	Groceries and provisions.	Stone, gravel, and sand.	Oil.	Unclassified and miscellaneous.	Total tonnage.
At St. Louis, Mo	8,650	81,000	113,200	76,000	55,500	197,172	3,099,697
At Little Rock, Mo., Commerce, Mo., and Cape Girardeau, Mo	....	38	18	7,953	....	313,014	952,373
At Cairo, Ill., to Birds Point, Mo., and Wickliffe, Ky., and Richardson, Tenn	....	111	197	....	....	33,561	34,824
At Memphis, Tenn., to Mound City, Ark., and West Memphis, Ark	....	15	208	....	....	11,999	17,097
At Helena, Ark., to Trotters Point, Miss	1,750	506	8,694	6,223	9,228	7,299	282,166
At Vicksburg, Miss., to Delta Point, La	....	67,778	3,198	4,058	1,377	160,403	394,630
At Natchez, Miss., Vidalia, La., Baton Rouge, La., Bayou Sara, La., Plaquemine, La., Anchorage, La	363	52,036	131,619	35,439	87,518	206,694	987,928
At New Orleans, La	....	223,797	7,004	9,963	84,081	1,827,610	3,045,163

Transfer of empty cars not included in tonnage at railroad transfer points.

Owing to deficiency and inaccessibility of the records of some transportation companies, considerable tonnage, which should appear under classified heads above, had to be included in "Unclassified and miscellaneous."

Statement of maps and charts issued and sold from July 1, 1917, to June 30, 1918, improving Mississippi River, Mississippi River Commission, secretary's office.

Description.	Free issue.	Sold.	Total.
Sheets, Mississippi River, scale 1:20000	687	334	1,021
Sheets, Mississippi River, scale 1:10000	220	36	256
Sheets, lower Mississippi River, scale 1 inch=1 mile	89	194	283
Sheets, upper Mississippi River, scale 1 inch=1 mile	188	222	410
Sets, upper alluvial valley (4 sheets each)	9	14	23
Sheets, upper alluvial valley	1	2	3
Sets, lower alluvial valley (8 sheets each), 1913 edition	6	7	13
Sheets, lower alluvial valley, 1913 edition	2	....	2
Sets, lower alluvial valley (8 sheets each), 1887 edition	3	21	24
Sheets, lower alluvial valley, 1887 edition	....	....	....
Sets, harbor New Orleans, scale 1:10000 (4 sheets each)	2	7	9
Sheets, district map of lower Mississippi River	6	9	15
Sheets, Lake Itasca Basin	2	16	18
Sets, St. Francis Basin (2 sheets each)	1	2	3
Sheets, St. Francis Basin	....	2	2
Total	1,216	866	2,082

Proceeds deposited to the credit of the Treasurer of the United States, $188.51.

TABLE No. 1.—*Highest and lowest gauge readings of 1917.*

MISSISSIPPI RIVER.

Station.	Distance from Cairo.	Elevation of gauge zero above mean Gulf level.	Highest.					Lowest.				
			Prior to 1917.		1917		Difference compared with previous highest.	Prior to 1917.		1917		Difference compared with previous lowest.
			Date.	Gauge reading.	Date.	Gauge reading.		Date.	Gauge reading.	Date.	Gauge reading.	
	Miles above.	*Feet.*		*Feet.*		*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Aitkin, Minn	1,090	1,186.35	July 6-8, 1905	16.36	Apr. 22	9.55	−6.81	Apr. 8, 9, 1911	•0.75	Nov. 27	1.80	+1.05
St. Paul, Minn	874	684.24	Apr. 29, 1881	19.7	Apr. 8	16.0	−3.7	Dec. 7, 1912	−1.0	Dec. 5	−1.0	.0
Hastings, Minn	849	670.36	Apr. 30, 1881	[1] 18.00	Apr. 9	14.9	−3.1	Nov. 23, 1892	− .70	Dec. 4, 8	.0	+ .7
Winona, Minn	760	639.90	June 18, 1880	16.87	Apr. 12	13.2	−3.67	Dec. 30, 1889	−1.33	Dec. 7-8	1.2	+ 2.53
Prairie du Chien, Wis	668	605.16	June 22, 1880	21.30	Apr. 15-16	14.2	−7.10	....do	− .10	Oct. 11	2.3	+ 2.40
Rock Island, Ill	510.7	541.94	June 27, 1892	19.4	Apr. 21	12.35	−7.05	Dec. 5, 1910	−1.15	Dec. 9	1.2	+ 2.35
Burlington, Iowa	427.6	510.82	May 18, 19, 1888 June 30, 1892	[2]17.6	June 17	11.62	−5.98	Dec. 10, 1910	−1.25	Dec. 19	[3] 3.10	+ 4.35
Fort Madison, Iowa	406.5	502.23	June 6, 1851	21.40	June 17-18	[3] 15.05	−6.35	1895	[4]− .3	....do	[3] 10.6	+10.9
Nashville, Iowa [5]	393.6	496.43	May 17, 18, 1888	12.0				Jan. 7, 1890	− .5			
Keokuk, Iowa	385.2	477.35	June 6, 1851	20.96	June 13	14.90	−6.06	Jan. 8, 1909	−2.1	Dec. 20	.25	+ 2.35
Hannibal, Mo	329.4	448.97	June 8, 1903	22.5	June 9	18.1	−4.4	Dec. 14, 1910	−1.80	Dec. 10	− .7	+ 1.10
Grafton, Ill	233	403.66	June 11, 1903	[6] 28.7	June 14	22.9	−5.8	Dec. 9, 1895	− .9	Dec. 13	1.4	+ 2.3
Alton, Ill	216.2	313.54	June 9, 1903	[7]115.80	....do	110.00	−5.80	Dec. 19, 1897 Jan. 28, 29, 1902	82.70	Dec. 12-13	83.50	+ .80
St. Louis, Mo	190.8	379.79	June 10, 1903	[8] 38.00	....do	32.90	−5.10	Jan. 2, 1900	−2.52	Dec. 30	−3.10	− .58
Chester, Ill	115.5	340.87	June 13, 1903	33.4	June 15-16	30.7	−2.7	Jan. 3, 1900	−4.0	Dec. 31	−1.2	+ 2.8
Grand Tower, Ill	85	321.74	June 14, 1903	33.80	June 16	32.2	−1.6	Feb. 1, 1895	1.1	....do	2.1	+ 1.0
Cape Girardeau, Mo	54.5	304.54	....do	[9] 36.53	....do	34.2	−2.33	Jan. 15, 1909	.6	Dec. 15-16	1.9	+ 1.3
Grays Point, Mo	48	300.85	Feb. 3, 1916	[10] 36.00	....do	34.10	−1.90	....do	.2	....do	.60	+ .40
Cairo, Ill	0	270.41	Apr. 7, 1913	54.69	Apr. 4-5	49.95	−4.74	Dec. 24, 1871	−1.00	Dec. 16-17	4.00	+ 5.00
	Below.											
Columbus, Ky	21.6	266.46	Apr. 8, 1913	49.30	Apr. 5	45.75	−3.55	Nov. 6-8, 1895	.05	Dec. 16	4.50	+ 4.45
Morrison Landing, Mo.[11]	69	256.04	Feb. 24, 1884	41.50				Nov. 11-13, 1879	− .17			
New Madrid, Mo	70.3	255.96	Apr. 9, 1913	44.61	Apr. 5-6	39.33	−5.28	Nov. 6-8, 1895	.55	Dec. 16	1.38	+ .83
Cottonwood Point, Mo	122.5	230.50	Apr. 11, 12, 1913	42.30	Apr. 7-8	37.45	−4.85	Nov. 5-8, 1895	−3.35	Dec. 17-18	[12]−1.7	+ 1.65
Fulton, Tenn	175.4	208.74	Apr. 9, 1913	44.07	Apr. 9	37.10	−6.97	Nov. 7, 8, 1895	.16	Dec. 17	[12]−1.75	− 1.91
Memphis, Tenn	230	184.21	....do	46.55	Apr. 10	40.38	−6.17	Nov. 6-9, 1895	−2.65	Dec. 18	− .5	+ 2.15
Mhoon Landing, Miss	276.3	161.35	Apr. 10, 1913	45.28	Apr. 10-12	42.32	−2.96	Nov. 6-11, 1895	−7.80	Dec. 19	−6.9	+ .90
Helena, Ark	306.5	141.81	Apr. 22, 1913	55.20	Apr. 12-13	49.90	−5.30	Nov. 8, 9, 1895	−3.00	Dec. 19-20	−1.70	+ 1.30
Sunflower Landing, Miss.	352.7	127.25	Feb. 10, 1916	51.60	Apr. 13-14	47.45	−4.15	Nov. 12-14, 1895	−1.50	....do	−1.00	+ .50

Mouth White River, Ark.	[illegible]	[illegible]	....do....	[illegible]	Apr. 15-18...	[illegible]	[illegible]	Dec. 28, 1872....	.00	Dec. 31...	2.70	+ 2.70
Arkansas City, Ark....	438.3	90.75	Feb. 10-11, 1916...	56.4	Apr. 18..........	52.11	4.20	Nov. 9, 10, 1895....	-3.6	....do..........	1.1	+ 4.7
Greenville, Miss..........	478.3	88.53	Apr. 12, 1912......	50.76	Apr. 19 21........	45.70	-5.00	Nov. 10, 11, 1895...	-2.55	Dec. 22..........	-1.20	+ 1.35
Lake Providence, La...	542.3	69.77	Feb. 15, 1916......	48.80	Apr. 20-21..........	44.70	-4.10	Nov. 17, 1895......	-5.30	Dec. 23..........	-1.45	+ 3.85
Vicksburg, Miss..........	599.3	46.16	....do..........	53.85	Apr. 23..........	49.98	-3.87	Nov. 13, 14, 1895...	-6.5	Dec. 24..........	- .60	+ 5.90
St. Joseph, La..........	648.3	33.15	....do..........	50.80	Apr. 22-25..........	46.80	-4.00	Nov. 13, 1895......	-9.3	....do..........	-6.65	+ 2.65
Natchez, Miss..........	700.3	17.09	....do..........	53.5	Apr. 25-27..........	49.9	-3.6	Nov. 13-15, 1895...	- .85	Dec. 25..........	1.6	+ 2.45
Red River Landing, La.	765.3	3.57	May 11, 12, 1912...	53.20	Apr. 28..........	47.62	-5.58	Nov. 14, 1895......	- .60	....do..........	2.30	+ 2.90
Bayou Sara, La..........	799.8	3.83	May 11, 1912......	47.37	Apr. 24-May 1.....	40.6	-6.77	Nov. 16, 1895......	-2.8	Dec. 24-27..........	-1.2	+ 1.6
Baton Rouge, La..........	833.3	- .42	....do..........	43.82	Apr. 29, May 1-2..	37.87	-5.95	Nov. 14, 1894......	.45	Dec. 27..........	1.20	+ .75
Plaquemine, La..........	854.1	.28	....do..........	39.38	Apr. 26..........	33.61	-5.77	....do..........	- .94	....do..........	.50	+ 1.44
Donaldsonville, La.....	885.4	-1.25	May 10, 1912......	35.1	Apr. 24, 25, 26..... Apr. 29-May 2.....	29.52	-5.58	Nov. 11, 1894......	1.00	Dec. 26..........	1.3	+ .30
College Point, La..........	904.5	.29	May 11, 1912......	30.18	May 1..........	25.22	-4.96	Nov. 14, 1894......	- .91	....do..........	- .55	+ .36
Carrollton, La..........	957	- .13	....do..........	21.05	May 2..........	16.90	-4.15	Dec. 27, 1872......	-1.60	Dec. 27..........	- .90	+ .70
Algiers, La..........	968	-2.64	....do..........	20.8	Apr. 28, 29..........	17.7	-3.1	Dec. 6, 1910......	1.9[illegible]	Dec. 8, 9..........	2.4	+ .45
Fort Jackson, La..........	1,039	-1.68	Mar. 1, 1916...... Sept. 29, 1915......	8.8 [13] 9.1	May 7..........	7.7	-1.1 -1.4	Dec. 7, 1893...... Nov. 12, 14, 1894...	.3	Dec. 10, 15, 16, 26, 27.	1.0	+ .7

NOTE.—High waters prior to 1880 are usually from old H. W. marks.

[1] H. W. of 1870 would read 18.76 feet.

[2] H. W. of 1851 would read 18.94 feet.

[3] Keokuk dam effective after May, 1913.

[4] Lowest reading during navigable season. The low water is now affected by dam and reads about 9.5 feet on gauge.

[5] The gauge was drowned out by backwater of Keokuk dam and readings discontinued after May 31, 1913.

[6] H. W. of June, 1844, would read 32.1 feet.

[7] H. W. of 1844 would read 118.94 feet.

[8] H. W. of June 28, 1844, would read 41.39 feet.

[9] H. W. of July 4, 1844, would read 42.53 feet.

[10] H. W. of July 4, 1844, would read 43.96 feet.

[11] Gauge transferred to New Madrid in 1893.

[12] Ice gorge above Fulton.

[13] Due to storm.

TABLE No. 1.—*Highest and lowest gauge readings of 1917*—Continued.

TRIBUTARIES OF MISSISSIPPI RIVER AND THE ATCHAFALAYA.

River.	Station.	Approximate distance of station from—	Elevation of gauge zero above mean Gulf level.	Highest.					Lowest.				
				Prior to 1917.		1917		Difference compared with previous highest.	Prior to 1917.		1917		Difference compared with previous lowest.
				Date.	Gauge reading.	Date.	Gauge reading.		Date.	Gauge reading.	Date.	Gauge reading.	
		Miles.	*Feet.*		*Feet.*		*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Arkansas	Little Rock, Ark	Mouth 174	222.06	May 21, 1892	31.20	June 12	16.20	−15.00	Sept. 9, 1913	− 0.20	Nov. 24-25	− 1.00	− 0.8
Do	Pine Bluff, Ark	Mouth 108	180.78	May 22, 1892	30.50	June 13	17.6	−12.90	Nov. 20-23, 1887	− .40	Nov. 16-19, 23-Dec. 2.	1.4	+ 1.80
Atchafalaya	Barbre Landing, La.	Head 0	3.88	May 11-15, 1912	53.55	May 1	44.95	− 8.60	Oct. 26, 1897	− 1.77	Dec. 26	1.70	+ 3.47
Do	Simmesport, La.[1]	Head 5	5.79	May 13, 1912	50.14	Apr. 30-May 3	41.7	− 8.44	Nov. 8, 1891	− 3.5	(2)		
Do	Melville, La	Head 31	.44	Feb. 14, 1916	43.0	Apr. 30-May 2	39.6	− 3.4	Nov. 12, 13, 1894	1.0	Dec. 28	5.6	+ 4.6
Cumberland	Nashville, Tenn	Cairo 246	366.17	Jan. 22, 1882	55.30	Mar. 10	45.70	− 9.60	Oct. 15, 16, 1878	− .40	July 14	[3] 7.10	+ 7.50
Illinois	Peoria, Ill	Mouth 160	428.52	Jan. 25, 1916	23.1	June 16	18.2	− 4.9	Aug. 30, Sept. 1, 1873. Aug. 5-12, 1874 Jan. 19-26, 1875	.00	Oct. 7-9, 15	[3] 10.3	+10.3
Do	Beardstown, Ill	Mouth 86	419.87	Feb. 25, 1883, Apr. 5, 6, 1913.	21.80	June 17	19.1	− 2.70	Sept. 18, 19, 1879	− .3	Oct. 11-17	[3] 8.3	+ 8.6
Missouri	Kansas City, Mo	Mouth 388	716.93	June 1, 2, 1903	[4] 35.0	June 9	26.5	− 8.5	Dec. 5-9, 1886, Jan. 8, 1890.	[5] .2	Dec. 15	3.7	+ 3.5
Do	Coles Creek, Mo.[6]	Mouth 107	413.54	May 15, 1892	96.76				Dec. 24, 1897	70.7			
Do	Hermann, Mo	Mouth 103	481.74	June 6, 1903	[7] 29.5	June 12	24.8	− 4.7	Dec. 21, 22, 1878	− .75	Jan. 1, 17-18	2.0	+ 2.75
Do	St. Charles, Mo	Mouth 28	413.53	June 8, 1903	[8] 33.95	June 13-14	28.95	− 5.00	Dec. 26, 1879	3.53	Feb. 6	5.20	+ 1.67
Ohio	Pittsburgh, Pa	Cairo 966	697.2	Mar. 15, 1907	35.5	Jan. 23	25.2	−10.3	Sept. 28, 1881	− 1.3	Feb. 14-15	9.6	+ 1.9
Do	Cincinnati, Ohio	Cairo 498	429.25	Feb. 14, 1884	71.06	Mar. 17	56.1	−14.96	Sept. 18, 1881	1.92	June 25	[3] 9.3	+ 7.38
Do	Louisville (upper), Ky.	Cairo 364	402.53	Feb. 16, 1884	46.60	Mar. 19	30.5	−16.10	1856	1.1	Dec. 22	[3] 3.9	+ 2.8
Do	Louisville (lower), Ky.	Cairo 364	375.59	do	72.00	do	56.1	−15.90	do	1.0	Oct. 12, Dec. 23	3.4	+ 2.4
Do	Evansville, Ind	Cairo 179	329.18	Feb. 19, 1884	48.8	Mar. 22	42.9	− 5.9	Nov. 7, 8, 1895	− .3	Oct. 8	2.6	+ 2.9
Do	Paducah, Ky	Cairo 43	286.26	Apr. 7, 1913	54.3	Mar. 25-26	47.1	− 7.2	Oct. 30-Nov. 4, 1895.	− .7	Oct. 18, 21-22	1.8	+ 2.5
Do	Cairo, Ill	Cairo 0	270.41	do	54.69	Apr. 4-5	49.95	− 4.74	Dec. 24, 1871	− 1.00	Dec. 16-17	4.00	+ 5.00
Ouachita	Camden, Ark	Mo. Red Riv. 387	71.10	May 12, 1882	46.0	Mar. 8	31.7	−14.3	Aug. 29, 30, 1887	1.80	Oct. 22-25	2.8	+ 1.00
Do	Monroe, La	Mo. Red Riv. 217	30.97	1874	49.1	Apr. 9	28.4	−20.7	Sept. 13-20, 1909	− 1.8	Oct. 22-26, Nov. 23-24.	[3] 1.5	+ 3.3

Red	Fulton, Ark	Mouth[10]	482	224.48	July 17, 1870	38.78	May 1	20.12	15.63	Sept. 20-28, Oct 20-22, 1890.	.10	Nov. 10-13	3.17	+ 3.07
Do	Garland, Ark.[6]	Mouth	424	203.10	Mar. 24, 1894	28.50				Sept. 22-25, 1890.	− .20			
Do	Shreveport, La	Mouth	300	140.99	August, 1849	35.90	May 4	10.4	−25.50	Dec. 2-4, 1894, Oct. 13, 1910.	− 5.50	Nov. 13-30	− 6.7	− 1.20
Do	Alexandria, La	Mouth	118	44.18	July 6, 1908	41.84	May 6	18.47	−23.37	Sept. 29, 1881	− 3.7	Nov. 19-28	.05	+ 3.75
St. Francis	Bridge St. L. I. M. & S. R.	Mouth	100	170.5	Apr. 4-6, 1897	41.6	Apr. 13-15	23.9	−17.7	Nov. 3-11, 1901	− .05	Oct. 24-Dec. 3	1.8	+ 1.85
Do	Wittsburg, Ark.[6]	Mouth	86		Apr. 28, 1886	42.02				Oct. 27-31, Nov. 10-14, 1892.	− 3.60			
Tennessee	Chattanooga, Tenn.	Cairo	509	617.81	Mar. 11, 1867	58.6	Mar. 7	[11] 47.7	−10.9	Sept. 11-14, 1881, Sept. 19, 1883.	.00	May 22	[11] 6.9	+ 6.90
Do	Florence, Ala	Cairo	301	400.85	Mar. 19, 1897	32.20	Mar. 12	24.70	− 7.50	Oct. 24, 28, 1872, Sept. 18, 1878.	− .76	Oct. 17-20, Dec. 20-22.	.00	+ .76
Do	Johnsonville, Tenn.	Cairo	141	315.89	1882, Mar. 24, 1897.	48.0	Mar. 18	38.8	− 9.2	Oct. 26-Nov. 4, 1904.	− .9	Sept. 28, Oct. 19-22, Nov. 26, 29-30.	1.5	+ 2.4
Wabash	Mount Carmel, Ill.	Cairo	221	372.27	Mar. 30, 1913	31.0	June 12	22.6	− 8.4	Nov. 7-23, 1895	− .2	Sept. 24	1.0	+ 1.2
White	Jacksonport, Ark	Mouth	264		Aug. 23, 1915	33.96	Apr. 6	26.08	− 7.88	Dec. 24, 1872	− 1.10	Nov. 16-22	.10	+ 1.20
Do	Clarendon, Ark	Mouth	100	138.47	Feb. 7, 1916	38.43	Apr. 20	27.57	−10.86	Nov. 22, 1887	4.07	Nov. 23-26, Dec. 1.	5.90	+ 1.83
Yazoo	Yazoo City, Miss.	Mouth	65	73.61	1882	36.50	Apr. 29	29.6	− 6.90	1875	− 4.30	Oct. 25-Nov. 7	− 2.0	+ 2.30

---

[1] Record from May, 1892, to December, 1905, in part only.
[2] Readings below 30 feet discontinued Jan. 16, 1915.
[3] Low stage affected by dam.
[4] H. W. of June, 1844, would read 37.0 feet.
[5] Jan. 6, 1874, gauge read −0.1; probably affected by ice.
[6] Discontinued.
[7] H. W. of June, 1844, would read 35.6 feet.
[8] H. W. of June, 1844, would read 39.57 feet.
[9] Stages below 6 feet affected by Davis Island Dam.
[10] Mouth of Red River is assumed to be at junction with Mississippi River.
[11] Stages affected by dam and power plant. See descriptive text.

TABLE No. 2.—*Highest gauge readings, Mississippi River and tributaries, in 1918 to June 30.*

[See Table No. 1 for previous highest known readings.]

River.	Station.	Date, 1918.	Gauge readings.
			Feet.
Mississippi	St. Paul, Minn	Mar. 25	7.5
Do	Rock Island, Ill	June 13–14	10.3
Do	Hannibal, Mo	June 13	17.7
Do	Grafton, Ill	June 16–17	17.5
Do	St. Louis, Mo	June 12	20.8
Do	Chester, Ill	June 13	19.6
Do	Grand Tower, Ill	do	21.6
Do	Cape Girardeau, Mo	June 14	23.0
Do	Cairo, Ill. (Ohio River)	Feb. 25	39.8
Do	Columbus, Ky	Feb. 25	37.7
Do	New Madrid, Mo	Feb. 25–26	31.1
Do	Cottonwood Point, Mo	Feb. 27	30.0
Do	Fulton, Tenn	Feb. 27–Mar. 1	[1] 27.0
Do	Memphis, Tenn	Mar. 1–2	29.9
Do	Mhoon Landing, Miss	Mar. 2	33.8
Do	Helena, Ark	Mar. 2–3	37.5
Do	Sunflower Landing, Miss	Mar. 3–5	36.4
Do	Mouth White River, Ark	Mar. 5	41.7
Do	Arkansas City, Ark	Mar. 5–7	39.8
Do	Greenville, Miss	Mar. 7	33.0
Do	Lake Providence, La	do	33.3
Do	Vicksburg, Miss	Mar. 8	37.7
Do	St. Joseph, La	Mar. 8–9	33.3
Do	Natchez, Miss	Mar. 8–10	36.4
Do	Red River Landing, La	May 10	34.8
Do	Bayou Sara, La	Mar. 9–12, May 10–12	28.3
Do	Baton Rouge, La	May 10	26.8
Do	Plaquemine, La	May 11	23.1
Do	Donaldsonville, La	May 12	20.6
Do	College Point, La	do	17.2
Do	Carrollton, La	do	11.7
Do	Fort Jackson, La	May 10–14	5.9
Arkansas	Little Rock, Ark	May 14	20.1
Atchafalaya	Barbre Landing, La	May 10–11	33.6
Do	Melville, La	May 9–12	32.2
Cumberland	Nashville, Tenn	Feb. 5	49.9
Illinois	Peoria, Ill	Feb. 20	19.7
Missouri	Kansas City, Mo	Apr. 2	19.2
Do	Hermann, Mo	Apr. 4–5, June 11	15.5
Do	St. Charles, Mo	Apr. 6	20.2
Ohio	Pittsburgh, Pa	Feb. 21	27.1
Do	Cincinnati, Ohio	Feb. 2	61.0
Do	Louisville, Ky. (upper)	Feb. 14	26.7
Do	Louisville, Ky. (lower)	do	51.9
Do	Evansville, Ind	Feb. 17	39.8
Do	Paducah, Ky	Feb. 25–26	36.6
Ouachita	Camden, Ark	Apr. 23	35.5
Do	Monroe, La	May 8, 10	26.5
Red	Fulton, Ark	Apr. 21	28.3
Do	Shreveport, La	Apr. 25–26	16.9
Do	Alexandria, La	Apr. 30	27.9
St. Francis	Bridge, St. Louis, Iron Mountain & Southern Ry.	May 24–26	17.6
Tennessee	Chattanooga, Tenn	Feb. 2	42.5
Do	Florence, Ala	Feb. 6	22.0
Do	Johnsonville, Tenn	Feb. 10	30.6
Wabash	Mount Carmel, Ill	Feb. 21	21.0
White	Jacksonport, Ark	May 14	32.4
Do	Clarendon, Ark	May 27–28	30.4
Yazoo	Yazoo City, Miss	Apr. 30, May 5–10	14.4

---

[1] Stage of 34.1 feet reached Feb. 4, account of ice gorge above going out.

TABLE No. 3.—*Results of discharge observations, Mississippi River.*

AT THEBES, ILL. (44.5 MILES ABOVE CAIRO, ILL.).

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
June 16	34.2	32.38	+0.3	110,563	110,563	44.6	44.6	60.7	2,479
June 17	34.1	32.22	− .1	[1] 109,233					
June 18, a. m	33.6	31.90	− .5	107,507	108,697	43.4	43.9	58.4	2,479
June 18, p. m		31.80		[1] 107,259					

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
June 16		7.39	816,644		816,644	2M	8	32	XI light.
June 17		7.35	802,496		802,496	2M			VI light.
June 18, a. m.	−1,866	7.46	802,284		802,284	2M	11	25	VI very light.
June 18, p. m.		6.92	742,157		742,157	2M			IV brisk.

[1] Interpolated.

The standard gauge column gives the 8 a. m. readings of the M. R. C. gauge at Cape Girardeau, Mo., the zero of which is 304.54 feet above mean Gulf level.

The zero of the local gauge is 301.18 feet above mean Gulf level.

Datum areas were computed below 32.38 feet on the local gauge.

In the column of method, 2M denotes the mean of simultaneous observations with two meters at six-tenths depth.

The discharge section is at street immediately above the Chicago & Eastern Illinois Railroad Depot.

Observations made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Mississippi River*—Continued.

AT COLUMBUS, KY. (21.6 MILES BELOW CAIRO).

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Mar. 24	44.6	44.6	+0.1	173,702	174,477	56.0	56.2	91.0	3,100
Mar. 26	44.8	44.8	+ .1	171,644	171,861	55.3	55.4	91.0	3,102
Mar. 27, a. m.	44.8	44.9	.0	172,993	172,993	55.8	55.8	91.4	3,102
Mar. 27, p. m.	....	44.9	....	[1] 172,993	....	....	....	....	3,102
Mar. 28	44.7	44.7	− .1	170,582	171,202	55.0	55.2	96.5	3,100

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Mar. 24	....	7.61	1,321,889	48,607	1,370,496	M	12	80	VI light.
Mar. 26	−2,616	7.99	1,371,788	48,607	1,420,395	M	12	45	VI brisk.
Mar. 27, a. m.	+1,132	7.80	1,348,619	48,607	1,397,226	M	14	65	IX strong.
Mar. 27, p. m.	....	7.52	1,301,151	48,607	1,349,758	2M	14	65	IX brisk.
Mar. 28	−1,791	7.27	1,240,478	48,607	1,289,085	2M	11	51	VI light to brisk.

[1] Derived from a. m. soundings.

The standard gauge column gives the 8 a. m. reading of the United States Engineer gauge at Columbus, Ky. The local gauge column gives the reading on the same gauge at the time of making the discharge measurement. The elevation of the gauge zero is 266.46 feet above mean Gulf level.

Datum areas were computed below 44.90 feet on this gauge.

Over-bank discharge deduced from measurements made on Mar. 26 and 27.

In the column of method, M denotes an observation with a single meter; 2M denotes the mean of simultaneous observations with two meters. Price meters Nos. 323 and 324 were used.

Meters were run at six-tenths depth.

The discharge section is that of 1916 and previous years.

Observations made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Mississippi River*—Continued.

AT FRIAR POINT, MISS. (318.5 MILES BELOW CAIRO).

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Mar. 29	46.5	4.3	+0.5	236,921	249,853	55.7	58.7	86.1	4,253
Mar. 31	47.3	4.8	+ .3	[1] 246,544					4,253
Apr. 1	47.6	5.2	+ .3	248,245	257,093	58.4	60.4	90.6	4,253
Apr. 2	47.9	5.5	+ .3	245,399	253,141	57.7	59.5	88.1	4,253
Apr. 3	48.0	5.6	+ .1	244,111	251,385	57.4	59.1	88.5	4,253
Apr. 3, p. m		5.6		[1] 244,111					4,253
Apr. 5	48.7	6.0	+ .4	248,283	253,728	58.4	59.7	88.5	4,253
Apr. 6	48.8	6.2	+ .1	245,917	250,554	57.8	58.9	88.9	4,253
Apr. 6, p. m		6.3		[1] 245,917					4,253
Apr. 7	49.0	6.4	+ .2	247,272	251,271	58.1	59.1	89.1	4,253
Apr. 8	49.3	6.7	+ .3	250,291	252,759	58.9	59.4	89.4	4,253
Apr. 9	49.5	7.0	+ .2	253,311	254,715	59.5	59.9	89.8	4,255
Apr. 10	49.7	7.1	+ .2	250,009	251,030	58.8	59.0	90.7	4,255
Apr. 10, p. m		7.1		[1] 250,009					4,255
Apr. 11	49.8	7.2	+ .1	249,615	250,253	58.7	58.8	88.0	4,255
Apr. 12	49.9	7.2	+ .1	248,382	248,808	58.4	58.5	90.8	4,255
Apr. 12, p. m		7.2		[1] 248,382					4,255
Apr. 13	49.9	7.3	.0	[2] 248,382					4,255
Apr. 14	49.8	7.2	− .1	250,615	251,211	58.9	59.0	87.8	4,255
Apr. 14, p. m		7.1		[1] 250,615					4,255
Dec. 25	2.0		+ .4	42,908		10.7		39.0	4,007

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Mar. 29		5.47	1,295,403	959	1,296,362	2M	17	110	V light.
Mar. 31		5.59	1,378,567	959	1,379,526	F	18		III light to V strong.
Apr. 1	+7,240	5.60	1,390,109	959	1,391,068	2M	18	90	Calm to IV light.
Apr. 2	−3,952	5.59	1,372,922	[3] 959	1,373,881	M	18	104	V light.
Apr. 3	−1,756	5.43	1,324,881	913	1,325,794	M	17	103	II light.
Apr. 3, p. m		5.81	1,417,991	913	1,418,904	F	20		Do.
Apr. 5	+2,343	5.64	1,399,146	821	1,399,967	2M	17	103	IX strong.
Apr. 6	−3,174	5.64	1,386,966	[3] 775	1,387,741	2M	19	90	Calm.
Apr. 6, p. m		5.90	1,449,814	775	1,450,589	F	22		Do.
Apr. 7	+ 717	5.72	1,415,351	898	1,416,249	M	18	108	III light to brisk.
Apr. 8	+1,448	5.72	1,431,455	1,021	1,432,476	M	18	101	VIII strong.
Apr. 9	+1,956	5.80	1,469,042	1,144	1,470,186	2M	18	94	X light.
Apr. 10	−3,685	5.64	1,409,268	1,267	1,410,535	2M	18	90	IV light.
Apr. 10, p. m		6.04	1,509,050	1,267	1,510,317	F	20		Calm.
Apr. 11	− 777	5.82	1,453,809	[3] 1,390	1,455,199	2M	18	97	Calm to III light.
Apr. 12	−1,445	5.88	1,459,385	1,390	1,460,775	M	18	85	VI light.
Apr. 12, p. m		5.98	1,484,638	1,390	1,486,028	F	20		V light.
Apr. 13		5.93	1,472,389	1,390	1,473,779	M	20		XI strong.
Apr. 14	+2,403	5.57	1,396,162	1,390	1,397,552	2M	16	93	VII light.
Apr. 14, p. m		6.00	1,502,705	1,390	1,504,095	F	19		II light.
Dec. 25		3.34	143,327		143,327	2M	17	44	II strong to X light.

---

[1] Derived from soundings of observation immediately preceding, corrected for change in stage.

[2] Derived from soundings of Apr. 12, a. m.

[3] Observed. Overbank discharge of all other days deduced from these observations.

The readings tabulated in the standard gauge column are the 8 a. m. readings on the United States Engineer gauge at Helena, Ark., the elevation of the zero of this gauge is 141.81 feet above mean Gulf level. The readings in the local gauge column were taken on a gauge near the discharge section at the time of discharge observations. The discharge section was the one used in 1916.

Datum areas were computed below 7.30 feet on the local gauge.

In the column of method, M denotes meter; 2M the mean of simultaneous observations with 2 meters; and F, double floats. Meters were run at six-tenths depth and the lower float at mid-depth. Meters used were Price No. 244 and Price No. 324, and Haskell No. 105, wheel 1/x.

Observations of high-water discharge made under direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary Mississippi River Commission.

Observations of low-water discharge and reduction of high and low measurements under direction of E. J. Thomas, assistant engineer, Secretary Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Mississippi River*—Continued.

AT CHICOT CITY, ARK. (433 MILES BELOW CAIRO.)

Date.	Gauges.			Cross section of discharge.					
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.			Width.
				Water.	Below datum.	Mean.	Mean datum.	Maximum.	
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Apr. 3	48.9	49.00	+0.3	213,230	224,714	59.2	62.4	74.0	3,600
Apr. 5	49.7	49.70	+ .5	216,744	225,708	60.2	62.7	73.3	3,600
Apr. 6	50.0	50.10	+ .3	220,590	228,114	61.3	63.4	75.8	3,600
Apr. 7	50.3	50.30	+ .3	[1] 221,310	....	....	....	....	3,600
Apr. 9	50.9	51.02	+ .3	224,405	228,617	62.3	63.5	77.2	3,600
Apr. 10	51.2	51.20	+ .3	225,155	228,719	62.5	63.5	76.2	3,600
Apr. 11	51.3	51.41	+ .1	228,579	231,378	63.5	64.3	82.8	3,600
Apr. 12	51.5	51.60	+ .2	226,935	229,059	63.0	63.6	77.3	3,600
Apr. 12, p. m.	....	51.65	....	[2] 227,115	....	....	....	....	3,600
Apr. 13	51.8	51.92	+ .3	224,070	225,042	62.2	62.5	79.2	3,600
Apr. 14	51.9	52.00	+ .1	229,630	230,314	63.8	64.0	77.5	3,600
Apr. 14, p. m.	....	52.02	....	[2] 229,702	....	....	....	....	3,600
Apr. 15	52.0	52.10	+ .1	231,775	232,099	64.4	64.5	79.3	3,600
Apr. 16	52.0	52.16	+ .0	226,605	226,713	62.9	63.0	78.2	3,600
Apr. 17	52.1	52.19	+ .1	235,580	235,580	65.4	65.4	84.2	3,600
Apr. 18	52.1	52.18	+ .0	230,030	230,066	63.9	63.9	77.5	3,600
Apr. 18, p. m.	....	52.16	....	[2] 229,958	....	....	....	....	3,609

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Apr. 3	....	6.26	1,335,512	10,500	1,346,012	2M	14	76	Calm.
Apr. 5	+ 994	6.41	1,389,018	12,300	1,401,318	M	13	66	XII strong.
Apr. 6	+2,406	6.36	1,403,486	13,400	1,416,886	F	14	80	Calm.
Apr. 7	....	6.39	1,413,066	13,900	1,426,966	2M	12	....	VII brisk.
Apr. 9	+ 503	6.38	1,430,815	15,700	1,446,515	M	14	101	II light.
Apr. 10	+ 102	6.58	1,481,788	16,200	1,497,988	2M	14	84	VII light.
Apr. 11	+2,659	6.61	1,510,157	16,800	1,526,957	M	14	82	Calm.
Apr. 12	−2,319	6.53	1,482,458	17,300	1,499,758	2M	14	77	IX light.
Apr. 12, p. m.	....	6.49	1,473,480	17,400	1,490,880	2M	13	....	Do.
Apr. 13	−4,017	6.69	1,499,867	18,100	1,517,967	M	14	62	II strong.
Apr. 14	+5,272	6.56	1,507,312	18,400	1,525,712	2M	14	76	II light.
Apr. 14, p. m.	....	6.75	1,550,965	18,400	1,569,365	F	18	....	Calm.
Apr. 15	+1,785	6.61	1,531,942	18,600	1,550,542	M	13	68	Do.
Apr. 16	−5,386	6.63	1,502,970	18,700	1,521,670	2M	13	82	VI light.
Apr. 17	+8,867	6.68	1,572,639	18,800	1,591,439	M	13	67	Calm.
Apr. 18	−5,514	6.59	1,515,634	18,700	1,534,334	2M	14	88	VII light.
Apr. 18, p. m.	....	6.69	1,538,195	18,700	1,556,895	M	12	....	VIII brisk.

[1] Derived from previous day's soundings, corrected for stage.
[2] Derived from forenoon soundings, corrected for stage.

The discharge section was the same as that used from Feb. 8 to 14, 1916.

The 8 a. m. readings on the M. R. C. gauge at Arkansas City are tabulated in the standard gauge column. Elevation of zero of gauge is 96.75 feet above mean Gulf level. The readings in the local gauge column are from a gauge at the discharge section, read at the time the measurements were made.

Datum areas were computed below 52.19 feet on the local gauge.

Over-bank measurement was made on left bank on Apr. 5 and 16, and at gap in old levee on Apr. 10 and 17. The items in the column headed "Discharge over bank per second" were deduced from these measurements.

In the column of "Method," M denotes one meter, 2M denotes the mean of simultaneous observations by two meters, and F denotes an observation by double floats, lower float being run at mid-depth. Meters were run at various depths and recorded velocities reduced to six-tenths depth velocities later.

Price meter No. 323 and Haskell meter No. 105, wheel 1 were used.

Observations made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary Mississippi River Commission.

Reductions made under the direction of E. J. Thomas, assistant engineer, secretary Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Mississippi River*—Continued.

AT ARKANSAS CITY, ARK. (438.3 MILES BELOW CAIRO.)

Date.	Gauges.			Cross section of discharge.						
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.				
				Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.	
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	
Dec. 24	2.9	....	+0.7	82,197	84,213	36.7	37.6	63.3	2,240	
Dec. 26, a. m.	3.7	....	+ .4	82,998	83,222	37.1	37.2	63.3	2,240	
Dec. 26, p. m.	3.8	....	....	[1] 83,222	....	....	....	....	2,240	

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Dec. 24	....	1.68	137,687	....	137,687	F	9	40	V Brisk.
Dec. 26, a. m.	−991	1.81	150,351	....	150,351	F	12	46	XI Light.
Dec. 26, p. m.	....	1.83	152,515	....	152,515	F	10	....	Calm.

[1] Area of Dec. 26, a. m., corrected for stage.

The discharge section was located at extreme lower end of Arkansas City, Ark., about 400 feet below sawmill.

Readings in the standard gauge column are from the M. R. C. gauge at Arkansas City and indicate the mean stage of the river during the observations. Zero of gauge is 96.75 feet above mean Gulf level.

Datum areas were computed below 3.8 feet on the standard gauge.

Under "Method," F denotes double floats, lower float at mid-depth.

Observations and reduction made under the direction of E. J. Thomas, assistant engineer, secretary Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Mississippi River*—Continued.

AT VICKSBURG, MISS. (599 MILES BELOW CAIRO).

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Apr. 17	49.5	1.5	+0.2	249,198	250,734	71.4	71.8	111.3	3,490
Apr. 18	49.6	1.6	+ .1	255,694	256,985	73.3	73.7	115.8	3,490
Apr. 19	49.7	1.7	+ .1	[1] 255,928					3,490
Apr. 20	49.8	1.8	+ .1	256,167	256,691	73.4	73.6	113.5	3,490
Apr. 21	49.9	2.0	+ .1	256,131	256,166	73.4	73.4	114.3	3,490
Apr. 23	50.0	2.0	+ .1	256,316	256,316	73.4	73.4	114.7	3,490
Apr. 24	49.9	1.9	− .1	255,725					
Apr. 25	49.8	1.8	− .1	254,887	255,410	73.0	73.2	112.7	3,490

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Apr. 17		5.03	1,253,368	185,700	1,439,068	2M	15	74	Calm.
Apr. 18	+6,251	5.13	1,312,927	185,700	1,498,627	M	15	103	IX light.
Apr. 19		5.08	1,299,534	194,700	1,494,234	M	14		IX brisk.
Apr. 20	− 294	5.21	1,336,736	204,700	1,541,436	2M	14	90	VIII light.
Apr. 21	− 525	5.19	1,329,048	192,900	1,521,948	2M	14	92	Calm.
Apr. 23	+ 150	4.95	1,268,391	190,400	1,458,791	F	17	93	Do.
Apr. 24		5.26	1,345,281	190,400	1,535,681	M	14		Do.
Apr. 25	− 906	5.07	1,291,048	190,400	1,481,448	M	15	110	Do.

[1] Derived from previous day's soundings, corrected for stage.

The readings tabulated in the standard gauge column are the 8 a. m. readings on the United States Engineer gauge at Vicksburg, Miss. Elevation of gauge zero is 46.16 feet above mean Gulf level. The local gauge readings were taken on a gauge at the discharge section at the time of the discharge observation.

The change in 24 hours was taken from the standard gauge.

Datum areas were computed below 50 feet on the standard gauge.

Over-bank discharge includes the Yazoo Canal.

In the column of "Method," M denotes an observation with a single meter, 2M denotes the mean o simultaneous measurements with 2 meters, and F denotes double floats. Meters were run at six-tenths depth and the lower float at mid-depth. Price meters Nos. 244 and 324 were used.

The discharge section was at the same location as that used in 1916.

Observations were made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Mississippi River*—Continued.

AT RED RIVER LANDING, LA. (765.3 MILES BELOW CAIRO).

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Apr. 13	45.00	45.00	+0.3	226,207	237,317	50.5	53.0	79.0	4,480
Apr. 16	45.90	45.95	+ .3	229,323	236,177	51.2	52.7	77.9	4,480
Apr. 18	46.45	46.50	+ .2	228,968	233,358	51.1	52.1	78.9	4,480
Apr. 20	46.80	46.80	+ .2	234,924	237,970	52.4	53.1	79.4	4,480
Apr. 22	47.30	47.32	+ .2	241,859	242,576	54.0	54.2	81.2	4,480
Apr. 24	47.50	47.48	+ .1	241,279	241,279	53.9	53.9	82.0	4,480

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Apr. 13	....	4.98	1,126,686	1,719	1,128,405	2M	11	58	X light.
Apr. 16	−1,140	4.95	1,135,336	1,719	1,137,055	2M	11	56	Calm.
Apr. 18	−2,819	4.95	1,133,731	[1] 1,719	1,135,450	2M	11	59	Do.
Apr. 20	+4,612	4.92	1,154,986	1,719	1,156,705	2M	11	52	Do.
Apr. 22	+4,606	4.92	1,189,119	1,719	1,190,838	2M	11	48	Do.
Apr. 24	−1,297	5.04	1,216,340	1,719	1,218,059	2M	11	42	Do.

[1] Measured.

The discharge section was the same as used in 1913 and previous years.

Datum areas were computed below 47.48 feet on the local gauge.

The gauge readings tabulated are from the United States Engineer gauge at Red River Landing. The 8 a. m. readings are given in the standard gauge column and the readings at the time of making the discharge measurements are given in the local gauge column. Elevation of zero of gauge is 3.57 feet above mean Gulf level.

In the column of method, 2M denotes the mean of simultaneous observations with two meters run at six-tenths depth.

Price meters Nos. 309 and 310 were used.

Observations made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Mississippi River*—Continued.

AT CARROLLTON, LA. (957 MILES BELOW CAIRO.)

Date.	Gauges.			Cross section of discharge.						
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.				
				Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Apr. 24	16.5	16.72	−0.1	183,764	184,176	84.8	85.0	109.6	2,168
Apr. 25	16.5	16.63	.0	182,827	183,584	84.4	84.7	110.0	2,168
Apr. 26	16.5	16.60	.0	183,838	184,507	84.8	85.1	110.0	2,168
Apr. 27, a. m.	16.6	16.66	+ .1	179,731	180,273	82.9	83.2	111.0	2,168
Apr. 27 p. m.	....	16.78	....	[1] 179,991	....	....	....	....	2,168
Apr. 28	16.6	16.70	.0	180,342	180,797	83.2	83.4	109.0	2,168
Apr. 29	16.7	16.77	+ .1	[1] 180,004	....	....	....	....	2,168
Apr. 30	16.8	16.78	+ .1	179,672	179,954	82.9	83.0	110.2	2,168
May 1, a. m.	16.8	16.86	.0	179,462	179,570	82.8	82.8	111.0	2,168
May 1, p. m.	....	16.88	....	[1] 179,462	....	....	....	....	2,168
May 2, a. m.	16.8	16.87	.0	180,765	180,852	83.4	83.4	111.3	2,168
May 2, p. m.	....	16.91	....	[1] 180,765	....	....	....	....	2,168
May 3	16.8	16.81	.0	179,070	179,287	82.6	82.7	111.1	2,168
May 4	16.7	16.79	− .1	178,692	178,952	82.4	82.5	109.5	2,168

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Apr. 24	....	6.15	1,129,714	700	1,130,414	2M	11	88	VII light.
Apr. 25	− 592	6.49	1,187,780	[2] 700	1,188,480	M	11	86	Calm.
Apr. 26	+ 923	6.23	1,144,416	700	1,145,116	2M	11	85	XII light.
Apr. 27, a. m.	−4,234	6.60	1,185,417	700	1,186,117	M	11	86	VI light.
Apr. 27, p. m.	....	6.17	1,109,851	700	1,110,551	2M	11	....	V brisk.
Apr. 28	+ 524	6.48	1,169,377	700	1,170,077	M	11	70	VI strong.
Apr. 29	....	5.98	1,075,908	700	1,076,608	F	14	....	Calm.
Apr. 30	− 843	6.38	1,146,292	700	1,146,992	2M	11	60	VI light.
May 1, a. m.	− 384	6.54	1,174,138	700	1,174,838	M	11	71	Strong.
May 1, p. m.	....	6.36	1,142,165	700	1,142,865	M	11	....	XII light.
May 2, a. m.	+1,282	6.30	1,138,210	700	1,138,910	2M	10	63	III light.
May 2, p. m.	....	6.27	1,133,921	700	1,134,621	2M	11	....	IV light.
May 3	−1,565	6.35	1,136,318	700	1,137,018	M	11	76	VI light.
May 4	− 335	6.43	1,148,157	700	1,148,857	M	11	65	Calm.

[1] Interpolated.

[2] Measured, other dates assumed to be the same.

The 8 a. m. readings on the United States Engineer gauge at Carrollton are tabulated in the standard gauge column. The readings on the same gauge at the time of discharge measurements are given in the local gauge column. The elevation of the zero of the gauge is 0.13 feet below mean Gulf level.

Datum areas were computed below 16.91 feet on the gauge.

In the column of method M denotes one meter; 2M the mean of simultaneous observations by two meters, and F denotes double floats. Meters were run at six-tenths depth; lower float at mid-depth. Price meter No. 323 and Haskell meter No. 105, wheel 1, were used.

The discharge section was the same as that used in 1916 and previous years.

Observations made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Mississippi River*—Continued.

AT CARROLLTON, LA. (957 MILES BELOW CAIRO).

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1918.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Jan. 25	−0.60	−0.20	−0.20	147,207	149,846	72.5	73.8	96.0	2,030
Jan. 26	.31	.10	+ .91	147,718	149,748	72.8	73.8	92.6	2,030
Jan. 27	.50	.48	+ .19	148,079	149,338	72.9	73.5	95.6	2,030
Jan. 28	.90	.85	+ .40	[1] 147,313	....	....	....	....	2,030
Jan. 29, a. m.	1.00	.95	+ .10	147,313	147,617	72.6	72.8	95.0	2,030
Jan. 29, p. m.	....	.90	....	[1] 147,313	....	....	....	....	2,030
Jan. 30	1.00	1.10	.00	147,169	147,169	72.5	72.5	95.4	2,030

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1918.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Jan. 25	....	1.20	177,240	....	177,240	2M	9	33	Calm.
Jan. 26	− 98	1.67	246,056	....	246,056	2M	9	24	VI strong.
Jan. 27	− 410	1.66	245,982	....	245,932	2M	9	44	Calm, VI strong.
Jan. 28	....	1.89	278,270	....	278,270	2M	8	....	VI strong.
Jan. 29, a. m.	−1,721	1.71	251,192	....	251,192	2M	9	38	I brisk.
Jan. 29, p. m.	....	1.56	229,289	....	229,289	F	8	....	II brisk.
Jan. 30	− 448	2.06	303,680	....	303,680	F	9	38	XII brisk.

[1] Area of Jan. 29, a. m.

The 8 a. m. readings on the United States Engineer gauge at Carrollton are tabulated in the standard gauge column. The readings on the same gauge at the time of discharge measurements are given in the local gauge column. The elevation of the zero of the gauge is 0.13 foot below mean Gulf level.

Datum areas were computed below 1.10 feet on the gauge.

In the column of method 2M denotes the mean of simultaneous observations with two meters run at six-tenths depth, and F denotes double floats, lower float at mid depth. Price meters Nos. 243 and 309 were used.

The discharge section was the same as that used in 1917 and previous years.

Observations and reduction made under the direction of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Missouri River, at St. Charles, Mo.*

Date.	Gauges.			Cross section of discharge.						
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.				Width.
				Water.	Below datum.	Mean.	Mean datum.	Maximum.		
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*		*Feet.*
June 14	[1] 28.48	....	0.0	42,340	....	25.7	....	48.0		1,645

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
June 14	....	9.95	421,345	....	421,345	M	11	16	

[1] Reading on United States Engineer gauge at St. Charles, Mo., at mean time of discharge measurement. The zero of the gauge is 413.53 feet above mean Gulf level.

Price meter No. 309 was used. It was run at six-tenths depth. Measurement was taken from Wabash Railroad bridge at St. Charles, Mo.

Observation made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission.

Table No. 8.—*Results of discharge observations, Cumberland River, at Nashvill, Tenn. (190.5 miles above mouth).*

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Mar. 9, a. m	45.60	45.72	+0.7	22,844	22,859	46.2	46.2	56.8	494
Mar. 9, p. m	....	45.75	....	[1] 22,859	....	....	....	....	494
Mar. 10, a. m	45.70	45.63	+ .1	22,719	22,778	46.0	46.1	56.8	494
Mar. 10, p. m	....	45.55	....	22,705	22,804	46.0	46.2	56.8	494
Mar. 11	45.20	45.17	− .5	21,790	22,077	44.2	44.8	57.0	494
Mar. 12, a. m	43.90	43.80	−1.3	21,378	22,337	43.6	45.6	56.0	490
Mar. 12, a. m	....	43.73	....	[1] 21,325	....	....	....	....	490
Mar. 12, p. m	....	43.35	....	21,072	22,253	43.0	45.4	56.0	490
Mar. 13	40.90	40.60	−3.0	20,062	22,596	40.9	46.0	52.0	490

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Mar. 9, a. m	....	6.28	143,486	....	143,486	2M	12	15	Calm.
Mar. 9, p. m	....	6.25	142,867	....	142,867	F	9	15	XII light.
Mar. 10, a. m	− 81	6.28	142,680	....	142,680	2M	11	15	I light.
Mar. 10, p. m	+ 26	6.27	142,462	....	142,462	2M	8	17	III brisk.
Mar. 11	−787	6.19	134,940	....	134,940	2M	13	22	III strong.
Mar. 12, a. m	+260	6.10	130,411	....	130,411	2M	10	11	V light.
Mar. 12, a. m	....	5.75	122,520	....	122,520	F	8	11	IX light.
Mar. 12, p. m	− 84	5.93	124,896	....	124,896	2M	10	11	Calm.
Mar. 13	+343	5.62	112,838	....	112,838	2M	9	10	III brisk.

[1] Interpolated.

The discharge section was located practically in the same place as that used in 1913.

The readings tabulated in the standard gauge column are the 8 a. m. readings on the United States Engineer gauge at Nashville, Tenn.; those tabulated in the local gauge column are on the same gauge at the time of measuring the discharge. The zero of the gauge is 366.17 feet above mean sea level.

Datum areas were computed below 45.75 feet on the gauge.

In the column headed Method, 2M denotes mean of simultaneous measurements with two meters, and F denotes double floats. The meters were run at six-tenths depth, and the lower float at mid-depth.

Price meters Nos. 244 and 322 were used.

Observations made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Tennessee River, at Riverton, Ala. (225 miles from mouth).*

Date.	Gauges.			Cross section of discharge.						
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.				
				Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Mar. 12, a. m.	24.70	4.50	....	53,167	53,440	42.8	43.0	49.5	1,243
Mar. 12, p. m.	....	4.60	....	53,005	53,154	42.6	42.8	49.5	1,243
Mar. 13	24.30	4.72	−0.4	52,702	52,702	42.4	42.4	49.7	1,243
Mar. 14, a. m.	23.50	4.38	− .8	52,275	52,698	42.1	42.4	48.5	1,243
Mar. 14, p. m.	....	4.23	....	[1] 52,130	....	....	....	....	1,243
Mar. 15, a. m.	21.90	3.10	−1.6	51,027	53,040	41.1	42.7	47.7	1,242
Mar. 15, p. m.	....	2.85	....	[1] 50,717	....	....	....	....	1,242
Mar. 16, a. m.	19.20	0.9	−2.7	47,712	52,449	38.6	42.4	51.5	1,237
Mar. 16, p. m.	....	0.35	....	[1] 47,032	....	....	....	....	1,237

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Mar. 12, a. m.	....	6.63	352,384	34,400	386,784	2M	13	25	V brisk.
Mar. 12, p. m.	−286	6.58	348,842	35,000	383,842	2M	13	51	V brisk to light.
Mar. 13	−452	6.21	327,284	35,606	362,890	2M	12	32	IV light to brisk.
Mar. 14, a. m.	− 4	6.38	333,385	33,200	366,585	2M	13	28	IX light.
Mar. 14, p. m.	....	5.81	302,616	32,200	334,816	F	13	....	IX light.
Mar. 15, a. m.	+342	5.60	285,708	24,104	309,812	2M	12	26	XII light.
Mar. 15, p. m.	....	5.65	286,314	22,500	308,814	2M	12	....	V very light.
Mar. 16, a. m.	−591	5.15	245,714	10,500	256,214	2M	12	45	I very light.
Mar. 16, p. m.	....	4.82	226,607	8,000	234,607	F	12	....	III to V light to brisk.

[1] Interpolated.

The discharge section is opposite upstream end of platform of railway depot.

The standard gauge readings taken at 8 a. m. on the United States Engineer gauge at Florence, Ala., the zero of which is 400.85 feet above mean sea level.

The local gauge readings were taken at mean time of velocity observations on a temporary gauge near the discharge section. Zero of local gauge was 397.5 feet above mean sea level.

Datum areas were computed below 4.72 feet on the local gauge.

The overbank discharge was measured on March 13 and 15, and computed for other days.

In the column headed method, F indicates double floats and 2M the mean of two meters. Price meters Nos. 323 and 324 were used. The lower float was run at mid-depth, and the meters at six-tenths depth.

Observations made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Yazoo River, at Redwood, Miss. (18 miles above mouth).*

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Apr. 22	[1] 49.90	....	[1] 0.0	[2] 32,539	....	33.4	....	73.9	[3] 1,045

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Apr. 22	....	0.66	21,600	....	21,600	M	7	31	Calm.

[1] United States Engineer gauge at Vicksburg; elevation of zero 46.16 feet above mean Gulf level.
[2] Does not include area occupied by piers.
[3] 975 feet after deducting width of piers.

The discharge section was at the Yazoo and Mississippi Valley Railway bridge near Redwood, Miss.
Velocity was measured with Price meter No. 324, run at six-tenths depth.
Observation made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.
Reduction made under the direction of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Black River, at Jonesville, La. (54 miles above mouth).*

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Apr. 27	[1] 47.60	[2] 48.53	....	37,846	....	33.6	....	60.4	1,125

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Apr. 27	....	0.57	21,615	....	21,615	F	3	23	II Light.

[1] Red River Landing United States Engineer gauge. Zero is 3.57 feet above mean Gulf level.
[2] Elevation of water surface above mean Gulf level as determined by levels from P. B. M. 4.

TABLE No. 3.—*Results of discharge observations, Little River, at Jonesville, La.*

Date.	Gauges.			Cross section of discharge.						
				Area.		Depth.				
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Apr. 27..................	[1] 47.60	[2] 48.53	....	10,267	....	23.1	....	50.0	445

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind:
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Apr. 27........	....	0.72	7,440	....	7,440	F	3	10	II Light.

[1] Red River Landing United States Engineer gauge. Zero is 3.57 feet above mean Gulf level.
[2] Elevation of water surface above mean Gulf level as determined by levels from P. B. M. 4.

The discharge section on Black River is in front of Yancey's house.

The discharge section on Little River is 15 feet below (away from Black River) edge of wagon bridge over Little River.

The water in Little River was flowing away from Black River.

The sum of the discharges of both the above tabulated sections constitutes the total discharge of Black River.

In Black River the direction of flow was toward Red River.

Velocities were measured by means of double floats, the lower float being run at mid-depth.

Observations made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Old River, at Texas & Pacific Railroad bridge (2½ miles from mouth).*

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Apr. 15	45.60	46.96	+0.3	39,690	42,036	34.5	36.6	60.0	1,150
Apr. 17	46.20	47.5	+ .3	39,808	41,533	34.6	36.1	61.2	1,150
Apr. 19	46.65	47.9	+ .2	41,925	43,190	36.5	37.6	63.2	1,150
Apr. 21	47.15	48.5	+ .3	42,836	43,411	37.2	37.7	69.2	1,150
Apr. 23	47.40	48.82	+ .1	43,725	43,932	38.0	38.2	69.0	1,150
Apr. 25	47.50	49.00	.0	43,622	43,622	37.9	37.9	65.8	1,150

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Apr. 15	....	6.41	254,312	[1] 24,100	278,412	2M	5	47	Calm.
Apr. 17	− 503	6.36	253,116	[2] 31,428	284,544	2M	5	38	XII light.
Apr. 19	+1,657	6.18	259,074	[1] 37,700	296,774	2M	5	34	III light.
Apr. 21	+ 221	6.24	267,168	[1] 47,200	314,368	2M	5	34	Calm.
Apr. 23	+ 521	6.13	267,964	[2] 52,603	320,567	2M	5	31	Do.
Apr. 25	− 310	5.88	256,519	[1] 55,800	312,319	2M	5	29	Do.

[1] From curve for overbank discharge, derived from "a."

[2] Measured.

Current runs from Mississippi River toward the Atchafalaya River.

In the standard gauge column are tabulated the 8 a. m. readings of the Red River Landing U. S. E. gauge of which the zero is 3.57 feet above mean Gulf level. The change in 24 hours is taken from this gauge. The local gauge was at the T. & P. R. R. bridge and the readings tabulated were taken at the time of the corresponding discharge observations.

Datum areas were computed below 49 feet on the local gauge.

In the method column 2M denotes the mean of simultaneous measurements by two meters run at six-tenths depth.

Price meters Nos. 309 and 310 were used.

The discharge section was about 200 feet below the T. & P. R. R. bridge.

Observations made under the direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary, Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission.

TABLE No. 3.—*Results of discharge observations, Atchafalaya River, at Simmesport, La. (5.5 miles below head).*

Date.	Gauges.			Cross section of discharge.					
				Area.		Depth.			
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.
1917.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Apr. 14	38.3	0.1	+0.4	58,805	61,780	52.3	54.9	80.8	1,125
Apr. 16	38.9	.7	+ .3	59,696	61,946	53.1	55.1	78.9	1,125
Apr. 17	39.2	.8	+ .3	59,549	61,687	52.9	54.8	80.9	1,125
Apr. 18	39.4	1.1	+ .2	60,336	62,136	53.6	55.2	83.0	1,125
Apr. 19	39.7	1.3	+ .3	61,190	62,765	54.4	55.8	81.4	1,125
Apr. 21	40.3	2.0	+ .4	60,825	61,613	54.1	54.8	83.2	1,125
Apr. 23	40.8	2.35	+ .3	61,661	62,055	54.8	55.2	83.3	1,125
Apr. 24	40.9	2.62	+ .1	61,772	61,862	54.9	55.0	82.1	1,125
Apr. 25	41.1	2.7	+ .2	62,829	62,829	55.8	55.8	84.0	1,125

Date.	Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
1917.	*Sq. ft.*	*Feet.*	*Cu. ft.*	*Cu. ft.*	*Cu. ft.*				
Apr. 14	....	4.26	250,366	....	250,366	2M	5	25	XII light
Apr. 16	+ 216	4.26	254,362	....	254,362	2M	5	38	III light.
Apr. 17	− 259	4.33	257,554	....	257,554	2M	5	28	Calm.
Apr. 18	+ 449	4.23	255,520	....	255,520	2M	5	28	VI light.
Apr. 19	+ 631	4.18	255,787	....	255,787	2M	5	32	Calm.
Apr. 21	−1,152	4.42	269,053	....	269,053	2M	5	29	VI light.
Apr. 23	+1,442	4.38	269,888	....	269,888	2M	5	29	Calm.
Apr. 24	− 193	4.41	272,190	....	272,190	2M	5	32	II light.
Apr. 25	+ 967	4.49	281,862	....	281,862	2M	5	36	Calm.

The location of the discharge section is approximately that of the 1916 section.

The readings tabulated in the standard gauge column are the 7 a. m. readings of the United States Weather Bureau gauge at Simmesport, La. Elevation of zero of gauge, 5.79 feet above mean Gulf level. The local gauge readings are from a gauge at the discharge section, read at the time the measurements were made.

Datum areas were computed below 2.7 feet on the local gauge.

Under the heading of method, 2M denotes the mean of two meters run simultaneously at six-tenths depth. Price meters Nos. 309 and 310 were used.

Observations made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.

Reduction made under the direction of E. J. Thomas, assistant engineer, secretary, Mississippi River Commission.

TABLE No. 4.—*Cost of dredging operations, May 1, 1917, to April 30, 1918.*

Class of work, or plant to which distributed.	Labor.	Office supplies.	Subsistence.	Fuel.	Lighting supplies.	Lubricants.
Care of plant	$41,090.26	$85.52	$14,248.98	$12,704.94	$306.55	$505.41
Repairs to floating plant:						
Dredge Beta	72.19	....	28.38	....	.53	....
Dredge Gamma	3,527.47	....	1,046.77	....	26.28	127.28
Dredge Delta	2,194.12	....	542.76	....	20.01	115.32
Dredge Epsilon	1,709.27	....	450.50	....	14.43	5.29
Dredge Zeta	3,930.50	....	1,114.38	....	26.79	67.24
Dredge Iota	4,020.42	....	1,090.99	....	45.95	43.95
Dredge Kappa	3,679.21	....	988.87	....	22.96	78.04
Dredge Henry Flad	3,981.21	....	1,018.70	....	42.18	118.49
Dredge B. M. Harrod	6,442.33	....	1,592.39	....	41.25	89.80
Steamer Sachem	1,189.41	....	321.97	....	.74	5.16
Steamer Choctaw	2,078.43	....	531.70	....	3.32	28.33
Steamer Leota	1,304.03	....	348.28	....	9.58	83.87
Steamer Inspector	2,556.10	....	721.85	....	12.07	24.83
Steamer Saturn	711.09	....	202.50	....	4.62	13.47
Steamer Jupiter	985.42	....	263.94	....	5.60	2.24
Steamer Vulcan	202.14	....	46.79	....	.27	9 87
Steamer Venus	289.87	....	73.93	....	.77	.46
Steamer Mars	364.22	....	94.84	....	1.35	11.91
Steamer Mercury	114.10	....	36.68	....	.51	7.78
Pile sinker No. 13	133.67	....	39.82	....	.73	....
Pile sinker No. 971	123.57	....	32.18	....	....	....
Pile sinker No. 981	751.96	....	216.77	....	1.68	....
Pile sinker No. 982	148.40	....	36.12	....	.57	5.88
Pile sinker No. 983	298.91	....	69.20	....	.46	1.37
Pump boat	33.26	....	6.44	....	....	....
Barge No. 041	36.37	....	9.90	....	....	....
Barge No. 061	18.89	....	4.36	....	.22	....
Skiffs	722.49	....	145.27	....	....	....
Motor boat M. R. C. No. 1	37.04	....	8.10	....	....	....
Motor boat M. R. C. No. 2	....	....	....	....	....	....
Floating derrick M. R. C. No. 1	120.30	....	22.10	....	....	5.40
Total	41,776.39	....	11,106.48	....	282.82	845.98
Operations during low-water season, 1917:						
Dredge Gamma	11,148.35	14.83	4,326.71	6,093.71	75.38	697.37
Dredge Iota	9,560.02	12.48	3,230.22	5,191.67	48.19	328.97
Dredge Kappa	548.50	....	199.06	136.00	....	....
Dredge Henry Flad	11,284.30	11.01	3,531.90	5,251.76	73.00	414.01
Dredge B. M. Harrod	11,409.58	10.59	3,858.12	6,214.44	29.31	307.15
Steamer Inspector	8,111.79	12.21	2,211.06	5,379.41	30.96	252.41
Steamer Saturn	3,083.36	34.60	1,001.86	829.16	28.31	35.75
Steamer Jupiter	3,302.02	21.45	1,581.59	2,297.51	37.92	32.70
Steamer Venus	2,919.70	41.17	805.61	781.47	28.54	56.06
Total	61,367.62	158.34	20,746.13	32,175.13	351.61	2,124.42
Side-haul railway dry dock, repairs to	2,205.44	....	605.52	....	.12	6.55
Buildings and grounds	2,738.13	....	739.31	....	6.59	237.90
Outfit, care, and repair of	5,869.63	....	1,467.06	....	21.65	12.35
Permanent outfit	....	....	....	....	....	....
Miscellaneous:						
Handling materials	1,464.24	....	383.52	....	....	....
Buoys, construction of	402.34	....	144.70	....	....	....
	1,866.58	....	528.22	....	....	....
Total cost of dredging operations	159,914.05	243.86	49,441.70	43,968.07	686.52	2,886.63

Table No. 4.—*Cost of dredging operations, May 1, 1917, to April 30, 1918*—Con.

Class of work, or plant to which distributed.	Material.	Permanent plant and outfit.	Hire of plant and renewals.	Repairs (nonpersonal service and material).	Total.	Grand total.
Care of plant	$375.79					$69,317.45
Repairs to floating plant:						
Dredge Beta	343.09				$444.19	
Dredge Gamma	2,912.64			$7.50	7,647.94	
Dredge Delta	2,614.98				5,487.19	
Dredge Epsilon	605.07				2,784.56	
Dredge Zeta	1,876.09				7,015.00	
Dredge Iota	1,965.75				7,167.06	
Dredge Kappa	2,362.77			2.50	7,134.35	
Dredge Henry Flad	1,038.59			6,850.00	13,049.12	
Dredge B. M. Harrod	3,668.59			9,150.00	20,984.36	
Steamer Sachem	523.59				2,040.87	
Steamer Choctaw	1,244.88				3,886.66	
Steamer Leota	645.05				2,390.81	
Steamer Inspector	1,756.47			35.00	5,106.32	
Steamer Saturn	333.63				1,265.31	
Steamer Jupiter	372.88			23.25	1,653.33	
Steamer Vulcan	149.11				408.18	
Steamer Venus	210.03				575.06	
Steamer Mars	129.18				601.50	
Steamer Mercury	42.35				201.42	
Pile sinker No. 13	78.47				252.69	
Pile sinker No. 971	6.90				162.65	
Pile sinker No. 981	136.05				1,106.46	
Pile sinker No. 982	39.08				230.05	
Pile sinker No. 983	87.06				457.00	
Pump boat					39.70	
Barge No. 041	.05				46.32	
Barge No. 051	1.92				25.39	
Skiffs	37.61				905.37	
Motor boat M. R. C. No. 1	11.44				56.58	
Motor boat M. R. C. No. 2	16 20				16.20	
Floating derrick M. R. C. No. 1	28.90				176.70	
Total	23,238.42			16,068.25	93,318.34	93,318.34
Operations during low-water season, 1917:						
Dredge Gamma	289.94				22,646.29	
Dredge Iota	438.46				18,810.01	
Dredge Kappa					883.56	
Dredge Henry Flad	361.53				20,927.51	
Dredge B. M. Harrod	204.04				22,033.23	
Steamer Inspector	83.03				16,080.87	
Steamer Saturn	118.98				5,132.02	
Steamer Jupiter	40.73				7,313.92	
Steamer Venus	93.78				4,726.33	
Total	1,630.49				118,553.74	118,553.74
Side-haul railway dry dock, repairs to.	1,200.42					4,018.05
Buildings and grounds	896.32			1.22		4,619.47
Outfit, care, and repair of	446.15					7,816.84
Permanent outfit		$14,424.68				14,424.68
Miscellaneous:						
Handling materials	43.28					1,891.04
Buoys, construction of	114.96					662.00
	158.24					2,553.04
Total cost of dredging operations.	4,707.41	14,424.68		16,069.47		314,621.61

TABLE No. 5.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1917.*

CAIRO TO MEMPHIS.

[NOTE.—The depths tabulated are merely those recorded by the inspection steamer in passing. No attempt was made to locate and record the minimum depth of water in the thalweg of the crossing.]

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Aug. 15 to 16.	Aug. 22 to 23.	Aug. 29 to 31.	Sept. 5 to 6.	Sept. 12 to 13.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	15.5-15.5	15-14.8	14-13	12-11.9	12.3-12.8
New Madrid gauge	70	11.5-11.9	10.9-11.1	10.4-9.7	8.7-8.6	8.8-8.9
Toneys Chute	76	[1] 13	....	....	....	....
Point Pleasant	80	[1] 13	....	....	....	....
Darnells	82	16	....	....	....	....
Ruddles Point	85	....	....	....	....	....
Cherokee	89	....	....	....	....	....
Fritz	101	....	....	....	....	....
Hathaway	102	....	....	....	....	....
Sandy Hook	103	....	....	....	....	....
Gayoso	104	[2] 9	....	....	....	....
Caruthersville Bend	114	....	....	....	....	....
Foot Island 16 (upper)	120	....	....	13	11	....
Foot Island 16 (lower)	121	15	....	....	....	14
Head Island 18	122	15	....	....	....	....
Cottonwood Point gauge	123	8.4-8.6	7.7-7.8	7.3-6.6	5.4-5.3	5.4-5.3
Richells	125	....	....	....	....	....
Head Island 20	128	15	....	....	12	14
Pine Grass	132	10½	....	12	10	10
Hales Point	136	....	....	....	....	....
River Styx	139	10	10	10	11	9
Forked Deer	146	....	....	....	17	....
Foot Island 26	153	12	12	11	11	12
Head Island 30, chute	160	16	15	....	13	....
Foot Island 30, chute	161	13	13	12	12	12
Plum Point	165	10	....	....	....	....
Drivers	169	....	10½	....	11	11
Flower Island	171	....	....	[3] 8	....	....
Fulton gauge	175	9.7-9.6	9.1-9.2	8.7-8.2	7.1-7.0	7.1-7.0
Sawmill Point	180	....	....	....	....	....
Random Shot	196	....	12	....	....	....
Pecan Point	198	....	....	....	12	14
Cedar Point	201	....	....	....	....	....
Carona	204	15	15	....	12	12
Massey Point	205	....	....	....	....	....
Old River	209	....	....	....	11	....
Brandywine	211	....	....	....	....	....
St. Clair	223	15	17	18	11	11
Arthur	225	....	....	....	....	....
Paddys Hen	227	16	....	....	....	....
Memphis gauge	230	11.2-10.9	10.4-10.3	9.8-9.3	8.2-8.0	7.8-7.9

[1] Reported by survey boat.
[2] From survey.
[3] Not controlling depth.

TABLE NO. 5.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1917*—Continued.

CAIRO TO MEMPHIS—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Sept. 19 to 20.	Sept. 25 to 26.	Sept. 28.	Oct. 2 to 4.	Oct. 9 to 10
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	12.3–12.0	9.4–8.7	8.2	10.2–10.5	9–8.4
New Madrid gauge	70	8.8–8.5	6.7–6.2	5.7	6.2–7.2	6.2–5.7
Toneys Chute	76					
Point Pleasant	80	9			9½	
Darnells	82	11			13	13
Ruddles Point	85	15			14	12
Cherokee	89					17
Fritz	101	14			14	12
Hathaway	102	12				
Sandy Hook	103				12	13
Gayoso	104	12			10	9½
Caruthersville	114					12
Foot Island 16 (upper)	120		10			
Foot Island 16 (lower)	121	12			11	11½
Head Island 18	122					
Cottonwood Point gauge	123	5.6–5.3	3.7–3.1	2.6	2.1–3.7	2.9–2.6
Mitchells	125		12		13	
Head Island 20	128		12		13	14
Blue Grass	132	10	12		12	14
Hales Point	136		11		11	11½
River Styx	139	13	11		12	12
Forked Deer	146					
Foot Island 26	153	14	11		11	13
Head Island 30, chute	160		15		10	13
Foot Island 30, chute	161	14	11		9	11
Plum Point	165					
Drivers	169	11	11	9½	11	11
Flower Island	171					
Fulton guage	175	7.5–7.1	5.6–5.0	4.4	3.7–5.2	4.8–4.5
Sawmill Point	180					
Random Shot	196					14
Pecan Point	198		10	10	14	13
Cedar Point	201			12	10	12
Corona	204		11	10	10½	13
Massey Point	205				11	13
Old River	209		12	12		
Brandywine	211				11	12
St. Clair	223	13	12	13	13	13
Arthur	225			12		
Paddys Hen	227	13	14	15	14	17
Memphis gauge	230	8.4–8.1	6.6–6.1	5.5	4.5–5.9	5.7–5.3

TABLE No. 5.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1917*—Continued.

CAIRO TO MEMPHIS—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Oct. 16 to 17.	Oct. 31 to Nov. 1.	Nov. 13 to 14.	Nov. 20 to 21.	Nov. 27 to 28.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	7.6–7.2	13.9–13.8	16.7–15.4	10.4–9.7	8.8–9.2
New Madrid gauge	70	4.8–4.6	9.4–9.6	12.5–11.5	7.3–6.6	5.6–5.7
Toneys Chute	76	....	....	....	....	....
Point Pleasant	80	....	....	....	....	....
Darnells	82	12	....	....	....	....
Ruddles Point	85	11	....	....	....	....
Cherokee	89	....	....	....	....	....
Fritz	101	11	....	....	....	....
Hathaway	102	....	....	....	....	....
Sandy Hook	103	12	....	....	....	....
Gayoso	104	9½	....	....	....	....
Caruthersville	114	12	....	....	....	....
Foot Island 16 (upper)	120	....	....	....	....	....
Foot Island 16 (lower)	121	10½	15	17	13	12
Head Island 18	122	....	....	....	....	....
Cottonwood Point gauge	123	1.5–1.4	5.4–6.0	10–8.9	4.4–3.5	2.1–2.2
Mitchells	125	11	....	....	....	11
Head Island 20	128	12	....	....	....	....
Blue Grass	132	11	15	18	14	11½
Hales Point	136	11	14	....	13	11½
River Styx	139	12	12	17	13	11½
Forked Deer	146	15	....	....	....	....
Foot Island 26	153	13	15	....	17	13
Head Island 30, chute	160	....	....	....	16	....
Foot Island 30, chute	161	10	15	14	13½	11
Plum Point	165	....	....	....	....	....
Drivers	169	11	14	17	15	9
Flower Island	171	....	....	....	....	....
Fulton gauge	175	3.3–3.2	6.9–7.4	11–10.3	6.6–5.7	4–4
Sawmill Point	180	14	....	....	....	....
Random Shot	196	13	....	....	....	....
Pecan Point	198	10	12	....	14	13
Cedar Point	201	11	....	....	13	10½
Corona	204	9½	15	....	15	13
Massey Point	205	13	15	....	16	16
Old River	209	....	....	....	13	16
Brandywine	211	12	16	....	....	....
St. Clair	223	12	13	....	13	9
Arthur	225	....	....	....	....	....
Paddys Hen	227	12	....	....	....	14
Memphis gauge	230	4.1–4.1	7–8.1	12.3–11.5	7.5–6.6	4.6–4.6

TABLE No. 5.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1917*—Continued.

CAIRO TO MEMPHIS—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.		
		Dec. 4 to 5.	Dec. 11 to 12.	Dec. 20 to 22.
		Feet.	*Feet.*	*Feet.*
Cairo gauge	0	8.4–8.2	8–6.8	5.8–7.6
New Madrid gauge	70	5.4–5.1	4.8–4	2.9–3
Toneys Chute	76	....	....	....
Point Pleasant	80	....	....	....
Darnells	82	....	....	....
Ruddles Point	85	....	....	....
Cherokee	89	....	....	....
Fritz	101	....	....	....
Hathaway	102	....	....	....
Sandy Hook	103	....	....	....
Gayoso	104	....	....	....
Caruthersville Bend	114	....	....	9
Foot Island 16 (upper)	120	....	....	....
Foot Island 16 (lower)	121	12	10½	10
Head Island 18	122	....	....	....
Cottonwood Point gauge	123	2.1–1.8	1.4–0.7	0–0
Mitchells	125	....	....	10
Head Island 20	128	....	....	10
Blue Grass	132	11	11	9
Hales Point	136	12	....	9
River Styx	139	12	10	9
Forked Deer	146	....	....	....
Foot Island 26	153	13	13	12
Head Island 30, chute	160	14	....	17
Foot Island 30, chute	161	12	11	10
Plum Point	165	....	....	....
Drivers	169	11	12	10½
Flower Island	171	....	....	....
Fulton gauge	175	4.1–3.8	3.4–3	3.4–2.2
Sawmill Point	180	....	....	....
Random Shot	196	....	....	....
Pecan Point	198	12	11	11
Cedar Point	201	10½	10½	10
Corona	204	12	11	12
Massey Point	205	....	....	11
Old River	209	16	....	11
Brandywine	211	....	....	....
St. Clair	223	10½	10½	9
Arthur	225	....	....	....
Paddys Hen	227	....	....	12
Memphis gauge	230	4.7–4.5	3.7–3.2	0.1–2.4

TABLE No. 5.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1917*—Continued.

MEMPHIS TO VICKSBURG.

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Sept. 24.	Sept. 27.	Oct. 5 to 6.	Oct. 18 to 23.	Nov. 21 to 25.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Memphis gauge	230	7.0	5.9	6.1–6.2	4.1–3.4	6.8–4.9
Four Mile Bayou	234	....	13	....	11	....
Berkleys	237	....	15	....	....	....
Dismal Point	239	13	12	13	[1] 8½	17
Head Josie Harry Chute	243	....	19	....	....	....
Foot Josie Harry Chute	247	14	15	17	15	16
Norfolk Landing	252	9½	....	....	....	....
Foot Cow Island	254	....	[2] 8½	12	[1] 9	12
Foot Cat Island	256	12	....	12	11	14
De Soto	257	....	....	13	....	....
Seypells	259	....	....	12	10	11
Mhoon Landing gauge	276	4.1	2.4	1.8–2.5	–0.6 to –1.6	4.2–1.1
Foot Walnut Bend	284	....	....	14	....	9
Helena gauge	306	....	....	4.9–5.7	3.4–2.6	8.1–5.2
Westover	318	....	....	13	12	....
Island 63	328	....	....	12	11	14
Sunflower Landing gauge	353	....	....	5–6	3.8–3.5	8.8–5.5
Head Island 68	361	....	....	12	....	15
Foot Island 68	364	....	....	....	9	....
Parkers	376	....	....	....	11	15
Henrico	386	....	....	....	12	15
Mouth White River gauge	393	....	....	9.2–10.1	8.2–7.2	14.1–10.4
Arkansas City gauge	438	....	....	6–7	5.6–5.2	12.2–8.3
Moss Lake	455	....	....	....	11	15
Salona	476	....	....	....	12	16
Greenville gauge	478	....	....	3.3–3.4	3.1–2.3	8.3–5.0
Vaucluse	486	....	....	....	12	....
Leota	511	....	....	....	11	....
Millers	529	....	....	....	9½	....
Baleshed	535	....	....	....	11½	16
Lake Providence gauge	542	....	....	3.2–3.1	2.5–1.6	8.7–5.1
Cottonwood	555	....	....	....	....	15
Salem	565	....	....	....	11	....
Henderson	573	....	....	....	9½	16
Vicksburg gauge	599	....	....	5.3–5	4.6–3.6	10.4–7.2

[1] Not controlling depth.

[2] Not thoroughly investigated.

TABLE No. 6.—*Dimensions of channel through bars, Mississippi River below Cairo, dredging season 1917, determined from surveys.*

Miles below Cairo.	Name of crossing.	Date of survey, 1917.	Least depth in channel 250 feet wide.	Least width of 9-foot channel.	Gauges and their readings at time of survey.		
					Readings.		Standard gauge at—
					Local gauge.	Standard gauge.	
			Feet.	*Feet.*	*Feet.*	*Feet.*	
70	Morrissons	Sept. 18	16	3,700	9.2	9.2	
		Sept. 27	10	630	5.9	6.0	New Madrid.
		Oct. 6	13	1,350	6.8	6.8	
		Oct. 13	13	960	5.1	5.0	
78	Toneys	Sept. 1	14	2,000	9.5	9.5	Do.
80	Point Pleasant	Aug. 13	13	2,400	11.7	11.8	
		Aug. 17	14	2,100	11.7	11.8	
		Aug. 23	13	2,000	11.1	11.1	
		Sept. 1	12.5	670	9.5	9.5	
		Sept. 6	9.5	300	7.5	8.6	
		Sept. 17	10	2,500	9.5	9.5	Do.
		Sept. 23	11.5	370	7.4	7.6	
		Oct. 2	10.5	650	6.6	6.2	
		Oct. 13	13.5	430	5.1	5.0	
		Oct. 19	13	300	4.5	4.3	
		Nov. 22	12.5	650	6.2	6.3	
		Dec. 3	12	600	5.7	5.6	
82	Darnells	Sept. 28	13	1,050	5.7	5.7	Do.
85	Ruddles Point	Sept. 28	13	700	5.7	5.7	Do.
104	Gayoso	Aug. 11	11	1,000	9.9	9.8	
		Aug. 15	9	600	8.4	8.4	
		Aug. 20	9	250	7.8	7.8	
		Sept. 4	8	200	5.8	5.6	
		Sept. 8	8	200	5.3	5.1	
		Sept. 12	9	275	5.6	5.4	
		Sept. 19	10.5	300	5.8	5.6	Cottonwood Point.
		Sept. 24	11.5	350	4.1	4.1	
		Oct. 3	9	300	3.7	2.9	
		Oct. 9	8	180	3.2	2.9	
		Oct. 20	10	260	1.1	.9	
		Oct. 26	8.5	150	1.4	.8	
		Nov. 16	11	700	7.2	7.5	
		Dec. 5	11	300	2.2	1.9	
121	Foot Island 16	Oct. 15	10.5	800	1.8	1.5	Do.
		Oct. 22	9	700	.9	.7	
132	Blue Grass	Aug. 15	10.5	750	9.5	9.7	Fulton.
		Aug. 24	12.5	1,000	9.0	9.2	
		Sept. 7	10	340	7.0	7.0	
		Sept. 28	11	300	5.0	4.4	
		Oct. 21	10.5	1,050	3.0	2.6	Do.
		Oct. 29	14	1,000	3.9	3.4	Cottonwood Point.
139	River Styx	Aug. 19	10	1,000	9.5	9.6	Fulton.
		Sept. 13	11.5	600	7.0	7.1	Do.
		Sept. 29	11.5	320	4.5	2.3	Cottonwood Point
		Oct. 10	11	350	4.5	2.7	
		Oct. 25	10	300	3.0	.7	
		Nov. 21	12	580	6.0	3.7	
155	Ashport	Sept. 9	12	1,160	7.0	6.8	Fulton.
161	Foot of Island 30, chute	Sept. 11	11	1,250	7.0	6.9	
		Sept. 24	11.5	1,300	6.0	6.1	Do.
		Oct. 13	9.5	600	4.5	3.6	
		Oct. 22	12	640	2.5	2.6	
		Nov. 23	12	670	4.5	4.9	
169	Drivers	Aug. 11–12	10.5	1,280	11–10.5	11–10.4	
		Aug. 27–28	11.5	440	8.0	8.8–8.8	
		Sept. 12	10	410	7.0	7.1	
		Sept. 25	11	300	6.0	5.6	Do.
		Oct. 3	12.5	600	4.5	4.2	
		Oct. 14	12	450	4.5	3.5	
		Oct. 24	12.5	400	3.0	2.4	
		Nov. 24	11	600	4.0	4.5	
196	Random Shot	Oct. 28	12.5	550	4.0	3.7	Do.
201	Cedar Point	Sept. 30	11	1,150	3.5	3.9	Do.
204	Corona	Oct. 2	10	1,050	4.5	4.5	Memphis.
223	St. Clair	Dec. 7	11	425	4.5	4.3	Do.
239	Dismal Point	Sept. 12–13	14	1,450	7.6	7.8–7.9	Do.
		Nov. 6	22	2,500	9.5	9.5	
252	Cow Island, Foot	Sept. 26	12	650	6.5	6.2	Do.
		Oct. 11	12.5	950	5.0	5.2	

TABLE No. 6.—*Dimensions of channel through bars, Mississippi River below Cairo, dredging season 1917, determined from surveys*—Continued.

Miles below Cairo.	Name of crossing.	Date of survey, 1917.	Least depth in channel 250 feet wide.	Least width of 9-foot channel.	Gauges and their readings at time of survey.		
					Readings.		Standard gauge at—
					Local gauge.	Standard gauge.	
			Feet.	*Feet.*	*Feet.*	*Feet.*	
253	Helm, upper	Sept. 11-12	13	1,050	7.6	7.8-7.8	Memphis.
		Nov. 6	16	([1])	9.5	9.5	
		Nov. 30	9	250	4.5	4.6	
256	Cat Island	Sept. 7-9	12	680	8.0	7.9-7.8	Do.
		Sept. 24	10	800	6.5	7.0	
		Nov. 5	19.5	1,200	9.0	8.9	
328	Island 63, foot	Oct. 14-15	15	600	....	4.1-3.8	Helena.
573	Henderson	Oct. 5	10	700	5.5	5.3	Vicksburg.
		Jan. 4, 1918	14	1,300	3.5	3.0	
710	Fords	Oct. 25	12	450	5.2	5.1	Natchez.
		Oct. 31	12.5	950	4.5	4.6	
		Nov. 26	25	1,700	9.0	9.1	
766	Red River	Nov. 1-3	7.7	....	4.0	4.0-4.3	Red River Landing.
		Nov. 8	12	1,600	7.8	7.7	
		Nov. 28	13.5	1,900	7.5	7.8	
764	Mouth Old River	Nov. 6	10.5	550	6.0	6.2	Do.
		Dec. 3	9	250	5.7	5.8	
		Dec. 10	11	400	5.6	5.5	

[1] Unlimited.

TABLE No. 7.—*Summary of dredging operations, Mississippi River below Cairo, during the low-water season of 1917.*

GAMMA.

Points of operation.	Distribution of time.								
	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making up tow.	Towing.	Not working, awaiting lower stage, etc.	Total.
	Hours.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*
Foot Cow Island (252), Sept. 25-Oct. 9	6.50	144.25	11.40	0.30	....	....	15.45	[1] 169.50	349.00
West Memphis (232), lying up Oct. 9-15	....	....	....	....	....	....	20.30	122.00	142.30
Fords (710), Oct. 15-31	6.05	74.40	7.45	....	....	3.10	190.15	[2] 101.35	383.30
Red River Crossing (766), Oct. 31-Nov. 8	34.00	62.40	4.25	....	....	....	23.20	[3] 63.45	188.10
Vicksburg (599), lying up Nov. 8-27	....	....	....	....	....	....	[4] 140.40	[5] 317.10	457.50
Mouth Old River (764), Nov. 27-Jan. 3, 1918	16.00	80.00	12.15	....	6.05	3.00	54.00	[6] 738.40	910.00
Going into winter quarters Jan. 3-Feb. 15, 1918	....	....	....	98.00	....	....	[7] 395.15	[8] 531.45	1,025.00
Total and average	62.55	361.45	36.05	98.30	6.05	6.10	839.45	2,044.45	3,456.00

[1] Includes 27.30 hours cleaning boilers.

[2] Includes 55.15 hours cleaning boilers; 16.20 hours tied up to hire stokers, and 9.30 hours lost account wind and fog.

[3] Includes 24 hours cleaning boilers.

[4] Includes 18 hours lost account fog.

[5] Includes 37 hours cleaning boilers.

[6] Includes 78 hours cleaning boilers and 23.45 hours lost account sick firemen.

[7] Includes 3 hours tied up account of storm.

[8] Includes 516.30 hours tied up account of ice in river and 15.15 hours taking on supplies.

TABLE No. 7.—*Summary of dredging operations, Mississippi River below Cairo during the low-water season of 1917*—Continued.

GAMMA—Continued.

Points of operation.	Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
	Miles.		*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Pounds.*	
Foot Cow Island (252), Sept. 25–Oct. 9	22	16	19,375	134	15–16	5.2	125	140
West Memphis (232), lying up Oct. 9–15	22							
Fords (710), Oct. 15–31	478	9	10,400	139	14	4.3	125	140
Red River Crossing (766), Oct. 31–Nov. 8	56	8	7,200	115	15	5.4	125	140
Vicksburg (599), lying up Nov. 8–27	167							
Mouth Old River (764), Nov. 27–Jan. 3, 1918	165	16	5,650	71	11–14	7.1	123	145
Going into winter quarters Jan. 3–Feb. 15, 1918	532							
Total and average	1,442	49	42,625	118	11–16	5.3	124	141

IOTA.

Points of operation.	Distribution of time.								
	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making up tow.	Towing.	Not working, awaiting lower stage, etc.	Total.
	Hours.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*
Drivers (169), Aug. 27–Sept. 16	5.45	132.50	11.00	7.10		1.50	98.45	[1] 231.40	489.00
Osceola T. H. (161), lying up Sept. 16–27	2.00					.45	5.00	257.40	265.25
Drivers (169), second time, Sept. 27–Oct. 3	3.50	56.45	3.35	42.40			2.25	[2] 30.50	140.05
Osceola T. H. (161), lying up Oct. 3–15				48.00			1.10	243.50	293.00
Foot Island 30 (161), Oct. 15–Nov. 23	2.05	61.15	4.40	2.15			.45	860.00	931.00
West Memphis (232), lying up Nov. 23–Dec. 3						7.00	23.40	211.35	242.15
Head Presidents Island (232), Dec. 3–6	7.25	40.30	5.10	3.55	0.40	2.30	2.05	8.15	70.30
West Memphis (232), lying up Dec. 6–20							1.55	350.50	352.45
Total and average	21.05	291.20	24.25	104.00	.40	12.05	135.45	2,194.40	2,784.00

---

[1] Includes 38.45 hours cleaning boilers; 24 hours holiday; and 54 hours waiting on firemen and cleaning boilers.

[2] Includes 12.55 hours short of labor.

TABLE No. 7.—*Summary of dredging operations, Mississippi River below Cairo, during the low-water season of 1917*—Continued.

IOTA—Continued.

Points of operation.	Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
	Miles.		*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Pounds.*	
Drivers (169), Aug. 27–Sept. 16	63	20	32,375	244	16	4.2	133	165
Osceola T. H (161), lying up Sept. 16–27	8							
Drivers (169), second time, Sept. 27–Oct. 3	8	5	10,750	189	15–16	5.3	134	164
Osceola T. H. (161), lying up Oct. 3–15	8							
Foot Island 30 (161), Oct. 15–Nov. 23	1	9	20,200	338	14	3.7	132	164
West Memphis (232), lying up Nov. 23–Dec. 3	71							
Head Presidents Island (232), Dec. 3–6	2	8	8,800	218	12	3.2	134	164
West Memphis (232), lying up Dec. 6–20	2							
Total and average	163	42	72,125	248	12–16	4.1	133	164

HENRY FLAD.

Points of operation.	Distribution of time.								
	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making up tow.	Towing.	Not working, awaiting lower stage, etc.	Total.
	Hours.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*
Plum Point (165), lying up, Aug. 8–17						2.40	69.25	154.10	226.15
Blue Grass (132), Aug. 17–23	2.15	68.25	2.00	10.55			26.15	[1] 31.40	141.30
River Styx (139), Aug. 23–Sept. 20	2.30	188.15	9.35	40.25		1.00	3.10	[2] 430.00	674.55
Blue Grass (132), second time, Sept. 20–29	.50	110.05	11.45	1.35			3.45	[3] 84.20	212.20
River Styx (139), Sept. 29–Oct. 11				9.00		.55	2.20	274.15	286.30
Gayoso (104), Oct. 11–20	8.35	114.00	14.10	11.35	2.35		26.20	[4] 49.25	226.40
Blue Grass (132), third time, Oct. 20–28	4.30	28.00	2.35	.15		1.25	[5] 38.35	[6] 110.30	185.50
River Styx (139), lying up, Oct. 28–Nov. 23						1.25	1.50	616.45	620.00
Osceola (165), Nov. 23–Dec. 26	3.05	17.10				1.10	5.40	[7] 765.25	792.30
Going into winter quarters, Dec. 26–31						2.15	24.30	110.45	137.30
Total and average	21.45	525.55	40.05	73.45	2.35	10.50	201.50	2,627.15	3,504.00

[1] Includes 11.30 hours cleaning boilers.
[2] Includes 211.50 hours short firemen and 36 hours holiday.
[3] Includes 9.20 hours sick firemen.
[4] Includes 37.30 hours cleaning boilers and 5.25 hours short of labor.
[5] Includes 7.55 hours coaling at Caruthersville.
[6] Includes 20.15 hours short of labor.
[7] Includes 61 hours lost account cold weather.

TABLE No. 7.—*Summary of dredging operations, Mississippi River below Cairo, during the low-water season of 1917*—Continued.

HENRY FLAD—Continued.

Points of operation.	Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
	Miles.		*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Pounds.*	
Plum Point (165), lying up, Aug. 8-17	67	....	....	....	....	....	....	....
Blue Grass (132), Aug. 17-23	33	5	7,025	103	17	4.6	116	128
River Styx (139), Aug. 23-Sept. 20	7	16	36,850	196	15-17	3.7	124	129
Blue Grass (132), second time, Sept. 20-29	7	13	18,050	164	15-16	4.2	124	131
River Styx (139), Sept. 29-Oct. 11	7	....	....	....	....	....	....	....
Gayoso (104), Oct. 11-20	35	10	16,650	143	14-15	5.1	124	134
Blue Grass (132), third time, Oct. 20-28	28	8	5,250	187	14-16	4.1	126	133
River Styx (139), lying up, Oct. 28-Nov. 23	7	....	....	....	....	....	....	....
Osceola (165), Nov. 23-Dec. 26	26	1	1,555	91	10-12	5.1	127	137
Going into winter quarters, Dec. 26-31	67	....	....	....	....	....	....	....
Total and average	284	53	85,380	162	10-17	4.2	124	132

B. M. HARROD.

Points of operation.	Distribution of time.								
	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making up tow.	Towing.	Not working, awaiting lower stage, etc.	Total.
	Hours.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*
Gayoso (104), Aug. 12-20	12.15	28.05	0.40	1.15	....	6.00	79.15	[1] 70.30	198.00
Caruthersville (110), lying up, Aug. 20-Sept. 5	....	....	....	....	....	1.30	2.00	381.30	385.00
Gayoso (104), second time, Sept. 5-16	5.15	50.35	3.00	159.40	3.30	6.00	6.45	28.15	[2] 263.00
Point Pleasant (80), Sept. 16-22	4.00	51.00	1.30	36.15	....	1.30	11.30	38.30	144.15
Caruthersville (110) Sept. 22-30	....	....	....	185.30	....	3.45	4.30	....	193.45
Morrissons (70), Sept. 30-Oct. 6	4.45	82.10	3.20	....	.30	....	51.45	[3] 4.30	147.00
Point Pleasant (80), second time, Oct. 6-17	5.00	89.30	6.45	....	....	7.00	4.15	[4] 148.20	260.50
Caruthersville (110), lying up, Oct. 17-22	....	....	....	....	....	1.20	4.40	117.25	123.25
Gayoso (104), third time, Oct. 22-25	2.30	39.15	2.30	....	....	....	1.45	[5] 26.00	72.00
Caruthersville (110), lying up, Oct. 25-Dec. 26	....	....	....	....	....	1.45	[6] 65.15	1,421.45	488.45
Going into winter quarters, Dec. 26-28	....	....	....	....	....	12.00	32.45	15.15	60.00
Total and average	33.45	340.35	17.45	382.40	4.00	40.50	264.25	2,252.00	3,336.00

[1] Includes 17 hours short of labor, 13 hours cleaning boilers, and 12 hours half holiday.

[2] Includes time at Caruthersville making repairs.

[3] Cleaning boilers.

[4] Includes 61 hours cleaning boilers, 24.15 hours short of labor, and 21.45 hours delayed by high wind.

[5] Short of labor.

[6] Includes 53.15 hours going to New Madrid to get steamers Barrett and Finley off ground and 11 hours to get steamer Saturn off ground.

TABLE NO. 7.—*Summary of dredging operations, Mississippi River below Cairo, during the low-water season of 1917*—Continued.

B. M. HARROD—Continued.

Points of operation.	Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
	Miles.		*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Pounds.*	
Gayoso (104), Aug. 12-20	128	4	7,600	271	18	7.1	138	134
Caruthersville (110), lying up, Aug. 2-Sept. 5	6							
Gayoso (104), second time, Sept. 5-16	18	13	12,900	255	16	8.1	132	136
Point Pleasant (80), Sept. 16-22	24	9	9,900	194	14-16	6.4	128	126
Caruthersville (110), Sept. 22-30	24							
Morrisons (70), Sept. 30-Oct. 6	40	11	16,350	199	16	4.3	122	132
Point Pleasant (80), second time, Oct. 6-17	10	11	18,500	207	15-16	4.8	128	134
Caruthersville (110), lying up, Oct. 17-22	30							
Gayoso (104), third time, Oct. 22-25	6	10	8,850	225	15	5.0	131	134
Caruthersville (110), lying up, Oct. 25-Dec. 26	118							
Going into winter quarters Dec. 26-28	122							
Total and average	526	58	74,100	218	14-18	5.7	130	133

APPENDIX 1 A.

LAWS AFFECTING THE MISSISSIPPI RIVER COMMISSION, JULY 1, 1917, TO JUNE 30, 1918.

[Public—No. 37—65th Congress.]

[H. R. 4285.]

AN ACT Making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes.

* * * * * * *

The Mississippi River Commission shall forthwith make an examination of the Memphis Harbor, on the Mississippi River at the mouth of Wolf River, and at the earliest practicable moment make such plans and take such steps, to be approved by the Chief of Engineers, as will remove the large sand bar in front of Memphis to such an extent as may be necessary in the interest of navigation at that point, such improvements to be paid out of any funds heretofore or hereafter appropriated for the work of the Mississippi River Commission, not to exceed, however, the sum of $250,000 for the current fiscal year.

* * * * * * *

SEC. 13. That amounts hereafter paid by private parties or other agencies for rental of plant owned by the Government in connection with the prosecution of river and harbor works shall be deposited in each case to the credit of the appropriation to which the plant belongs.

Approved, August 8, 1917.

LAWS AFFECTING THE MISSISSIPPI RIVER COMMISSION SINCE JULY 1, 1917.

[Public—No. 181—65th Congress.]

[H. R. 12441.]

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and nineteen, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the fiscal year ending June thirtieth, nineteen hundred and nineteen, namely:

* * * * * * *

FLOOD CONTROL: For prosecuting work of flood control in accordance with the provisions of the flood-control Act approved March first, nineteen hundred and seventeen, as follows:

Mississippi River, $6,670,000.

Approved, July 1, 1918.

[Public—No. 200—65th Congress.]

[H. R. 10069.]

AN ACT Making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes.

* * * * * * *

SEC. 4. That no part of the funds herein or hereafter appropriated for works of river and harbor improvement shall be used to pay for any work done by private contract if the contract price is more than twenty-five per centum in excess of the estimated cost of doing the work by Government plant: *Provided,* That in estimating the cost of doing the work by Government plant, including the cost of labor and materials, there shall also be taken into account proper charges for depreciation of plant and all supervising and overhead expenses and interest on the capital invested in the Government plant, but the rate of interest shall not exceed the maximum prevailing rate being paid by the United States on current issues of bonds or other evidences of indebtedness.

SEC. 5. That whenever the Secretary of War, in pursuance of authority conferred on him by law, causes proceedings to be instituted in the name of the United States for the acquirement by condemnation of any lands, easements, or rights of way needed for a work of river and harbor improvement duly authorized by Congress, the United States, upon the filing of the petition in any such proceedings, shall have the right to take immediate possession of said lands, easements, or rights of way, to the extent of the interest to be acquired, and proceed with such public works thereon as have been authorized by Congress: *Provided*, That certain and adequate provision shall have been made for the payment of just compensation to the party or parties entitled thereto, either by previous appropriation by the United States or by the deposit of moneys or other form of security in such amount and form as shall be approved by the court in which such proceedings shall be instituted. The respondent or respondents may move at any time in the court to increase or change the amounts or securities, and the court shall make such order as shall be just in the premises and as shall adequately protect the respondents. In every case the proceedings in condemnation shall be diligently prosecuted on the part of the United States in order that such compensation may be promptly ascertained and paid.

SEC. 6. That in all cases where private property shall be taken by the United States for the public use in connection with any improvement of rivers, harbors, canals, or waterways of the United States, and in all condemnation proceedings by the United States to acquire lands or easements for such improvements, where a part only of any such parcel, lot, or tract of land shall be taken, the jury or other tribunal awarding the just compensation or assessing the damages to the owner, whether for the value of the part taken or for any injury to the part not taken, shall take into consideration by way of reducing the amount of compensation or damages any special and direct benefits to the remainder arising from the improvement, and shall render their award or verdict accordingly.

SEC. 7. That hereafter the Chief of Engineers, United States Army, shall indicate in his annual reports the character of the terminal and transfer facilities existing on every harbor or waterway under maintenance or improvement by the United States, and state whether they are considered adequate for existing commerce. He shall also submit one or more special reports on this subject, as soon as possible, including, among other things, the following:

(a) A brief description of such water terminals, including location and the suitability of such terminals to the existing traffic conditions, and whether such terminals are publicly or privately owned, and the terms and conditions under which they may be subjected to public use.

(b) Whether such water terminals are connected by a belt or spur line of railroad with all the railroads serving the same territory or municipality, and whether such connecting railroad is owned by the public and the conditions upon which the same may be used, and also whether there is an interchange of traffic between the water carriers and the railroad or railroads as to such traffic which is carried partly by rail and partly by water to its destination, and also whether improved and adequate highways have been constructed connecting such water terminal with the other lines of highways.

(c) If no water terminals have been constructed by the municipality or other existing public agency there shall be included in his report an expression of opinion in general terms as to the necessity, number, and appropriate location of such a terminal or terminals.

(d) An investigation of the general subject of water terminals, with descriptions and general plans of terminals of appropriate types and construction for the harbors and waterways of the United States suitable for various commercial purposes and adapted to the varying conditions of tides, floods, and other physical characteristics.

SEC. 8. That if the Secretary of War shall determine that any of the contracts for work of river and harbor improvements entered into but not completed prior to April sixth, nineteen hundred and seventeen, the date of the entrance of the United States into the war with Germany, have become inequitable and unjust on account of increased costs of materials and labor and other unforeseen conditions arising out of the war, he is hereby authorized, in his discretion and with the consent of the contractors, to modify and readjust the terms of said contracts in such manner as he may deem equitable and just: *Provided*, That such modifications and readjustments shall apply only to work under said contracts remaining to be done hereafter and shall not include any relief for work performed heretofore under said contracts, and any such sum as may be necessary to provide for the increased cost of the contracts due to said modifications and readjustments, not exceeding the sum of $2,000,000, is hereby appropriated out of any money in the Treasury not otherwise appropriated: *Provided further*, That as a condition of any such contract be so modified, the Secretary of War shall have the right, at the end of any fiscal year, until the contract is completed, to make such further modifications as in his judgment shall be advantageous to the United States and just to the contractor.

Sec. 9. That hereafter when the expenses of persons engaged in field work or traveling on official business outside of the District of Columbia and away from their designated posts of duty are chargeable to appropriations of the Engineer Department, a per diem of not exceeding $4 may be allowed in lieu of subsistence when not otherwise fixed by law.

Approved, July 18, 1918.

Appendix 2.

IMPROVING MISSISSIPPI RIVER, FIRST AND SECOND DISTRICTS.

The first district extends from Cape Girardeau, Mo., to the foot of Island 40, a distance of 270 miles. The second district extends from foot of Island 40 to the mouth of White River, a distance of 173 miles.

District headquarters: Memphis, Tenn.

District officer: Lieut. Col. G. P. Howell, Corps of Engineers, until November 9, 1917. Montgomery Gardner, assistant engineer in charge, since November 10, 1917.

President, Mississippi River Commission: Col. James G. Warren, Corps of Engineers, United States Army, acting president, to July 10, 1917. Brig. Gen. W. H. Bixby, United States Army, acting president, July 10–18, 1917; president since.

WORKS.

I. Revetments:
  (*a*) Columbus, Ky.
  (*b*) Hickman, Ky.
  (*c*) Slough Landing Neck, Tenn.
  (*d*) New Madrid, Mo.
  (*e*) Gayoso Bend, Mo.
  (*f*) Caruthersville, Mo.
  (*g*) Barfield, Ark.
  (*h*) Plum Point Reach, Ark. and Tenn.
  (*i*) Golden Lake, Ark.
  (*j*) Hopefield Bend, Ark.
  (*k*) Memphis Harbor, Tenn.
  (*l*) Norfolk, Miss.
  (*m*) Star Landing, Miss.
  (*n*) Porter Lake, Ark.
  (*o*) Walnut Bend, Ark.
  (*p*) Trotters, Miss.
  (*q*) Helena, Ark.
  (*r*) Delta, Miss.
  (*s*) Oldtown, Ark.
  (*t*) Sunflower, Miss.
II. Experimental revetment.
III. Wolf River.
IV. Levees:
  (*a*) Upper St. Francis district.
  (*b*) Reelfoot district.
  (*c*) Lower St. Francis district.
  (*d*) Upper Yazoo district.
  (*e*) White River district.
V. Surveys.
VI. Plant.

(*a*) *Columbus, Ky.*

Location and description.—Twenty-one miles below Cairo, left bank.

Original condition.—For some years prior to 1890 the river bank in front of Columbus was subjected to more or less active caving, finally resulting in the necessity of fixing the channel and of preventing further encroachment upon the town, whose river front property was already in close proximity to the bank.

Previous projects.—None.

Existing project.—The existing project was adopted in 1889 and contemplated the installation of submerged revetment dikes along the Columbus front.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—All dikes are in effective condition and suggest no probable need of further expenditure.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The river channel in the vicinity of Columbus has been fixed and the town protected from its further encroachments. The bank between dikes and for some distance below has been maintained.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(b) *Hickman, Ky.*

Location and description.—Thirty-six miles below Cairo, left bank.

Original condition.—Throughout the eighties active caving was in progress along the Hickman river front, to the extent that in the year 1889 it became necessary to initiate revetment for the maintenance of the Hickman Harbor and for the protection of its river front property.

Previous projects.—None.

Existing project.—The existing project, adopted in 1889, provided for the revetment of the caving bank, to the end of holding the river channel in its then position and of preventing threatened destruction of town property.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The revetment throughout is in good condition. No change of any consequence has occurred since last report.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The town of Hickman has been guarded against serious property loss; its river slope has been made stable, and the channel in front of the town has been permanently located.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(c) *Slough Landing Neck, Tenn.*

Location and description.—Sixty-eight to eighty miles below Cairo, left bank.

Original condition.—This is a long narrow point of land around which the Mississippi River flows, making acute bends on the upper and lower sides. Active bank caving had been in progress in both bends for a number of years, resulting in a progressive diminution of the distance across the neck. Moreover, incident to the extreme floods of 1912 and 1913, marked surface scour developed from rapid crossflow, thereby bringing into question a serious hazard of cut-off, the effect of which would be a disturbance of river conditions over a period of years and for many miles above and below the neck.

Previous projects.—None.

Existing project.—The existing project was adopted in 1913 to eliminate the danger of cut-off, by the revetment of the bends to prevent further bank loss and by the construction of a levee or dike along the neck to check crossflow and surface scour during the higher river stages.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—About 80 per cent of the revetment required on the upper side of the neck is completed. The work is in excellent condition with the exception of a few breaks in the bank pavement. Bank caving has definitely ceased throughout the length of bend where caving was most active. Caving, however, is in progress from the downstream end of the work for a distance of about 4,000 feet.

The levee, or dike, longitudinal of the neck, has effectively eliminated the question of crossflow and consequent surface scour.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The heretofore caving bend has been stabilized. The point of the confronting reef has moved downstream correspondingly. In conjunction with the levee or dike, constructed throughout the length of the neck, the threatened cut-off of the river, across the latter, has been obviated.

Proposed operations.—Extension, downstream, for a distance of about 4,000 feet will probably have to be made during the next two or three years unless the caving ceases or decreases materially in rate.

The necessity, or the contrary, for revetment on the lower side of the neck will depend wholly upon the further development of river conditions in the vicinity. Present indications point strongly to the probability that the main draw of the river will leave the caving bend, and that its revetment will therefore not be required.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*d*) *New Madrid, Mo.*

Location and description.—Seventy-one miles below Cairo, right bank.

Original condition.—New Madrid is located at the head of a sharp bend of the river, opposite Watsons Point or Slough Landing Neck. The bank in front of the town had eroded for a number of years, to the point that in 1893 it was determined to be necessary to install revetment in order to fix the curvature of the river in this vicinity, and to guard the town against its further inroads.

Previous projects.—None.

Existing project.—The existing project, dating from 1893, had in view the construction of a sufficient length of standard fascine revetment to stabilize river and bank conditions along the New Madrid front.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The entire work is in excellent condition.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The curvature of the stream throughout the New Madrid bend has been fixed, the front of the town made secure, and the destruction of its river front property prevented.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*e*) *Gayoso Bend, Mo.*

Location and description.—One hundred and six miles below Cairo, right bank.

Original condition.—Caving in Gayoso Bend has been quite active for a number of years, and had progressed until the river bank was in such dangerous proximity to the controlling levee line that the United States constructed a levee loop around the most threatened point in 1914. This loop was extended downstream by the local levee board during 1915–16. A further retirement of the levee was deemed inadvisable on account of low and swampy country behind the existing levee which would render levee construction unduly costly; hence, protection by revetment was authorized at the joint cost of the Federal Government and local levee district.

Previous projects.—None.

Existing project.—Adopted in 1916; contemplates the protection of the levee in this bend by the installation of standard fascine revetment.

Operations and results during the fiscal year.—Operations consisted in the installation of 2,200 feet of standard fascine channel mattress. Paving along this stretch, however, has not been completed. Work was in progress at the time that the last annual report was submitted but was suspended on June 3, 1917, on account of the high stage of the river. Operations were resumed on July 10, 1917, and continued until December 7, 1917, when the outfit was moved to Osceola, Ark.

The foregoing operations were accomplished by hired labor with Government plant, at a total cost of $145,875.85.

The following table gives detailed costs:

GAYOSO BEND, MO. (106 R.), FIRST AND SECOND DISTRICTS.

Mattresses, total area 5,784 squares (channel mats, 74 per cent; connecting mats, 26 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$175.00	....	$0.030
½-inch strand...pounds..	20,050	1,768.78	3.467	.306
5/16-inch strand...do....	12,215	876.24	2.115	.151
¼-inch strand...do....	37,300	2,387.20	6.450	.412
Wire, No. 9...do....	14,800	558.32	2.559	.096
Wire, silicon br...do....	650	133.25	.112	.023
Staples...do....	1,400	44.10	.242	.008
Clips, ½ inch...number..	2,031	227.48	.351	.039
Clips, 5/16 inch...do....	2,203	140.33	.381	.024
Brush and poles...cord..	7,154.2	13,692.98	1.238	2.368
Rope, manila...pounds..	5,413	1,586.01	.936	.274
Miscellaneous expenses	....	339.74	....	.059
Subsistence	....	11,755.59	....	2.053
Steamboat expenses	....	6,312.13	....	1.096
Labor	....	15,121.91	....	2.655
Supervision	....	3,690.65	....	.635
Total	....	58,809.71	....	10.169
Total field cost	....	58,809.71	....	10.169

BALLASTING AND SINKING.

Items.	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$60.00	....	$0.013
Stone...tons..	3,898	8,887.44	0.674	1.587
Rope, manila...pounds..	1,864	546.21	.322	.094
Miscellaneous expenses	....	84.96	....	.015
Subsistence	....	3,001.00	....	.518
Steamboat expenses	....	985.25	....	.170
Labor	....	3,582.37	....	.618
Supervision	....	768.90	....	.133
Total	....	17,916.13	....	3.098
Total field cost	....	17,916.13	....	3.098

Grading, 2,196 squares.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$60.00		$0.027
Rope, manila ... pounds	1,835	537.65	0.836	.245
Coal ... tons	285	1,140.00	.130	.519
Oil		26.40		.012
Miscellaneous expenses		224.02		.102
Subsistence		1,477.70		.673
Steamboat expenses		545.03		.248
Labor		2,308.44		1.051
Supervision		457.66		.209
Total		6,776.90		3.086
Total field cost		6,776.90		3.086

Paving.

Items.	Stone (1,507 squares).				Concrete (557 squares).			
	Quantity used.		Per square.		Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$85.00		$0.056		$50.00		$0.090
Stone ... tons	4,250	9,690.00	2.820	6.430				
Rope, manila ... pounds	3,592	1,054.46	2.383	.700	1,796	526.23	3.224	.945
Cement ... sacks					2,114	1,183.84	3.795	2.136
Sand and gravel ... cubic yards					650	436.50	1.167	.784
Coal ... tons					22	88.00	.039	.158
Miscellaneous expenses		124.49		.083		11.87		.021
Subsistence		5,661.04		3.756		1,901.22		3.413
Steamboat expenses		2,196.37		1.457		561.74		1.019
Labor		6,715.04		4.456		1,001.30		1.798
Supervision		1,620.32		1.076		524.00		.945
Total		27,146.72		18.013		6,284.70		11.309
Total field cost		27,146.72		18.013		6,284.70		11.309

Summary of costs (2,200 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.[1]
	Per square.	Total.	Per square.	Total.	
Total field cost	$13.287	$76,725.84	$17.747	$40,208.32	$116,934.16
Office expenses	.238	1,371.13	.312	706.34	2,077.47
Surveys	.070	399.11	.090	205.61	604.72
Care of plant	.595	3,441.54	.782	1,772.92	5,214.46
Repair of plant	.518	2,997.01	.681	1,543.91	4,540.92
Depreciation of plant	1.884	10,892.72	2.476	5,611.40	16,504.12
Total	16.572	95,827.35	22.088	50,048.50	145,875.85

[1] Total cost per linear foot can not be given on account of bank paving not being completed.

Condition at the end of fiscal year.—Caving continues upstream from the upper end of the revetment; however, the margin between the river bank and the levee is of such width that the levee will not be endangered for some years to come. The work, nevertheless, should be extended upstream at some time in the future in order to fully protect the levee in this bend.

Local cooperation.—The St. Francis Levee Board of Missouri contributed $150,000 toward the cost of this work.

Terminal facilities.—None.

Effect of improvement.—The revetment placed has resulted in stabilizing of the river bank and the protection of the levee.

Proposed operations.—Completion of upper bank paving along this year's work with the available balance.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*f*) *Caruthersville, Mo.*

Location and description.—One hundred and ten miles below Cairo, right bank.

Original condition.—Prior to 1898 the river in this vicinity had approached the town of Caruthersville, to the point of requiring that the town front be revetted as the alternative to the serious destrucion of its property and levee. It was desirable as well to hold this point as an assistance in fixing the banks, both above and below, where, for some distance, the controlling levee was quite close to the river.

Previous projects.—None.

Existing project.—The existing project provided for the holding of the Caruthersville point in the interest of channel and bank conditions in the locality, and dates from the year 1898. It contemplated the construction of a spur dike and sufficient fascine revetment to effect the purpose outlined.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The work is in excellent condition throughout.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The improvement has resulted in the prevention of further bank erosion, in the fixing of river conditions in the vicinity, and in guarding the town of Caruthersville and adjacent levees from serious destruction.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*g*) *Barfield, Ark.*

Location and description.—One hundred and forty-one miles below Cairo, right bank.

Original condition.—Caving has been very active from River Styx to Barfield Landing; at the latter point the controlling levee was breached. The topographical features of the country adjacent to the levee were such that to rebuild the levee on a location sufficiently remote from the caving bank to insure anything like a reasonable length of life, would be unduly expensive; therefore, protection by the installation of bank revetment was authorized with the understanding that the local levee board would construct a levee loop around the breach in the levee at Barfield Landing, Ark.

Previous projects.—None.

Existing project.—Adopted in 1916; contemplates the protection of the levee in this vicinity by the installation of standard revetment.

Operations and results during the fiscal year.—Operations consisted in the installation of 2,822 feet of standard fascine channel mattress. Grading and paving along this stretch, however, has not been fully completed. Work was in progress at the time that the last annual report was submitted, but was suspended on June 7, 1917, on account of the high stage of the river; operations were resumed on August 1, 1917, and continued until December 13, 1917, when the outfit was moved to a safe ice harbor on account of heavy running ice, and later towed to Memphis on February 15, 1918.

The foregoing operations were accomplished by hired labor with Government plant at a total cost of $161,936.35.

The following table gives detailed costs:

BARFIELD, ARK. (141 R), FIRST AND SECOND DISTRICTS.

Mattresses, total area 8,608 squares (channel mats., 95 per cent; connecting mats., 5 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$380.00	....	$0.044
½-inch strand....pounds	51,300	3,546.59	5.960	.412
5/16-inch strand....do	21,374	1,169.16	2.482	.136
¼-inch strand....do	30,374	3,863.94	3.529	.449
Wire, No. 9....do	19,800	940.10	2.300	.109
Wire, silicon bronze....do	950	225.00	.111	.026
Staples....do	1,950	61.43	.226	.007
Clips, ½-inch....number	3,040	376.30	.353	.044
Clips, 5/16-inch....do	2,700	171.99	.312	.019
Brush and poles....cord	10,707.6	18,738.31	1.244	2.177
Rope, manila....pounds	6,520	1,910.36	.758	.222
Miscellaneous expenses	....	474.65	....	.055
Subsistence	....	10,897.25	....	1.266
Steamboat expenses	....	8,901.02	....	1.034
Labor	....	15,986.28	....	1.857
Supervision	....	4,843.97	....	.563
Total	....	72,486.35	....	8.420
Total field cost	....	72,486.35	....	8.420

BALLASTING AND SINKING.

Mobilization and demobilization	....	$110.00	....	$0.012
Stone....tons	5,146.4	11,733.79	0.598	1.363
Rope, manila....pounds	2,468	723.12	.287	.084
Miscellaneous expenses	....	177.00	....	.021
Subsistence	....	2,345.86	....	.273
Steamboat expenses	....	1,202.30	....	.139
Labor	....	3,844.00	....	.447
Supervision	....	867.50	....	.101
Total	....	21,003.57	....	2.440
Total field cost	....	21,003.57	....	2.440

Grading (3,248 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$110.00	....	$0.037
Rope, manila....pounds	1,787	523.59	0.550	.161
Coal....tons	402	1,349.00	.124	.415
Oil	....	39.10	....	.012
Miscellaneous expenses	....	576.58	....	.178
Subsistence	....	2,091.10	....	.640
Steamboat expenses	....	639.99	....	.197
Labor	....	4,278.68	....	1.318
Supervision	....	601.31	....	.185
Total	....	10,209.35	....	3.148
Total field cost	....	10,209.35	....	3.143

Paving (stone, 1,955 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilización		$73.49		$0.038
Stone ... tons	5,634.6	12,846.89	2.882	6.571
Rope, manila ... pounds	4,225	1,237.92	2.161	.632
Miscellaneous expenses		188.23		.095
Subsistence		3,860.67		1.974
Steamboat expenses		2,211.34		1.130
Labor		5,966.19		3.056
Supervision		1,150.61		.589
Total		27,535.34		14.085
Total field cost		27,535.34		14.085

Summary of costs (2,822 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.[1]
	Per square.	Total.	Per square.	Total.	
Total field cost	$10.860	$93,489.92	$17.228	$37,744.69	$131,234.61
Office expenses	.140	1,207.58	.225	493.23	1,700.81
Surveys	.002	15.60	.003	6.38	21.98
Care of plant	.473	4,072.50	.759	1,663.41	5,735.91
Repair of plant	.395	3,392.46	.731	1,602.55	4,995.01
Depreciation of plant	1.506	12,956.10	2.415	5,291.93	18,248.03
Total	13.376	115,134.16	21.361	46,802.19	161,936.35

[1] Total cost per linear foot can not be given on account of upper bank work not being completed.

Condition at the end of fiscal year.—Caving continues above, below, and in the gap between the revetment. The revetted bank has been stabilized.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The effect of the revetment placed has resulted in the protection of the levee where the caving bank was threatening same.

Proposed operations.—Completion of grading and paving along the stretch of work installed during the present fiscal year, with the available balance. Placing of 3,000 feet of revetment in the gap, which will connect the two ends of revetment; and an upstream extension of 1,000 feet during the coming season when necessary funds become available; and a further extension both upstream and downstream of about 3,000 feet on each end as the funds therefor become available.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*h*) *Plum Point Reach, Ark. and Tenn.*

Location and description.—One hundred and forty-seven to 185 miles below Cairo.

Original condition.—In accordance with the first plans of the commission, construction operations were limited to two reaches of the river where navigation difficulties were the most pronounced. The upper one, known as Plum Point Reach, covered the river from the head of Island 26, 147 miles below Cairo, to Randolph, Tenn., a distance of 38 miles. In this reach channel depths of 4½ to 6 feet were frequently reported. The early construction work was limited to the stretch between Ashport, Tenn., 153 miles below Cairo, and Bullerton towhead, a distance of 15 miles.

The width of the river between the high water banks in this reach was largely in excess of the average, being 10,000 feet for much of its length, which resulted in shallow shifting channels.

Previous project.—To correct this condition, works were inaugurated in 1881 providing for contraction of the low water channel to a width of 3,000 feet. this to be accomplished by means of permeable pile dikes, the closure of chutes behind towheads and islands, and the revetment of caving banks.

The development of hydraulic dredges and their success in maintaining temporary channels of ample depth during the low water periods resulted, in 1895, in the suspension of channel contraction work, and since that date work has been confined to repairs to revetments.

Existing project.—Repairs to revetments.

Operations and results during the fiscal year.—The necessary plant and materials arrived at Osceola, Ark., on December 8, 1917, with which to extend upstream the Osceola revetment for the protection of the existing levee, but before any work could be accomplished operations were interrupted on account of abnormal weather conditions which resulted in the formation of an enormous ice gorge which did not go out until February 7, 1918. The breaking up of the ice gorge was followed by a rise in the river, preventing any work.

Condition at the end of fiscal year.—The revetment works throughout Plum Point Reach are generally in effective condition with the exception of that at the lower end of Ashport Bend, which was flanked some years since, and at the upper end of the Osceola revetment, where a deep pocket cave has occurred since the last report.

High water attack continues at the downstream end of the new Bullerton Bar revetment, where a pocket cave developed during the high water of 1916, resulting in the total loss of about 1,000 feet of the old work.

The stone and brush dam at the head of chute of Island 30 has been destroyed, as heretofore reported, for a width of 1,300 feet near its center and flanked around its western end.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The channel throughout Plum Point Reach has been rendered more stable and its depths materially increased. Bank caving has been prevented throughout the length of the several revetments and the Arkansas levee from Fletchers Bend to near Bullerton has been thus protected, as have also the towns of Luxora and Osceola, Ark.

Proposed operations.—It is proposed to extend upstream the Osceola revetment 2,000 feet to cover the pocket cave referred to above.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*i*) *Golden Lake, Ark.*

Location and description.—One hundred and ninety-two miles below Cairo, right bank.

Original condition.—Caving had been in progress for many years prior to 1911. In the bend of Golden Lake the levee line had been located between the river and a large area of low marshy ground to the rear. Its relocation would, therefore, have been both difficult and costly. The river had attained such proximity to the said levee line by 1911 as to require that the river channel be stabilized and further caving be prevented by the installation of revetment.

Previous projects.—None.

Existing project.—Adopted in 1911; had in view the prevention by bank revetment of further erosion in order that the channel might be held in definite position, the existing levee line maintained, and the construction of a costly levee loop around Golden Lake obviated.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The revetment is in good condition with the exception that a pocket cave has set up at its lower end with some loss of upper bank paving. This condition is of relatively small consequence for the present and no evidence exists that it will require any attention for several years.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—Bank caving throughout the length and in the vicinity of the revetment has been stopped and the existing levee line maintained, thereby avoiding the necessity and expense of a costly levee loop around Golden Lake. The channel has been held to position throughout the bend.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*j*) *Hopefield Bend, Ark.*

Location and description.—Two hundred and twenty-seven miles below Cairo, right bank.

Original condition.—The old course of the river in this locality crossed from the Tennessee shore above Memphis in a long sweep to the Arkansas shore, thence by an acute bend back to the Tennessee shore in the vicinity of Memphis. This situation involved persistent and finally very active caving from about Mound City, Ark., downstream to Hopefield Point. It became evident about 1880 that continued loss of bank throughout the stretch of river in question would seriously damage, if not destroy, the important harbor of Memphis.

Previous projects.—None.

Existing project.—Adopted in 1882; contemplated the revetment of the bend between Hopefield and Mound City, to the extent necessary to hold the river in its then course, and to thus maintain the harbor of Memphis.

Operations and results during the fiscal year.—Operations consisted in the repairs to a small pocket cave about 1,500 feet above Hopefield Point and repairs to the concrete paving of the earthen dike. The necessary plant and material was assembled for this work on September 8, 1917, which was completed on October 22, 1917.

The foregoing operations were accomplished by hired labor with Government plant, at a total cost of $11,390.46.

The following table gives detailed costs:

HOPEFIELD BEND, ARK. (227 R.), FIRST AND SECOND DISTRICTS.

Mattresses, total area 180 squares (connecting mats, 100 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$47.20		$0.262
[illegible]-inch strand ... pounds	250	17.38	1.390	.096
[illegible]-inch strand ... do	630	45.05	3.500	.250
[illegible]-inch strand ... do	1,035	78.97	5.750	.439
Wire, No. 9 ... pounds	630	30.24	3.500	.168
Staples ... do	40	1.26	.222	.007
Clips, [illegible] inch ... number	20	2.44	.111	.012
Brush and poles ... cord	286.4	501.20	1.480	2.785
Rope, manila ... pounds	578	179.18	3.211	.995
Miscellaneous expenses		31.40		.175
Subsistence		351.15		1.951
Steamboat expenses		101.75		.565
Labor		357.32		1.985
Supervision		86.00		.478
Total		1,830.54		10.170
Total field cost		1,830.54		10.170

Mattresses, total area 180 squares (connecting mats, 100 per cent)—Continued.

BALLASTING AND SINKING.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$15.34	....	$0.085
Stone.....tons..	140	319.20	0.778	1.773
Rope, manila.....pounds..	390	120.90	2.167	.673
Miscellaneous expenses	....	15.59	....	.086
Subsistence	....	108.05	....	.600
Steamboat expenses	....	33.07	....	.184
Labor	....	102.75	....	.571
Supervision	....	27.95	....	.155
Total	....	742.85	....	4.127
Total field cost	....	742.85	....	4.127

Grading (195 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$29.50	....	$0.151
Miscellaneous expenses	....	23.30	....	.120
Subsistence	....	187.67	....	.964
Steamboat expenses	....	63.59	....	.322
Labor	....	185.80	....	.954
Supervision	....	53.75	....	.276
Total	....	543.61	....	2.787
Total field cost	....	543.61	....	2.787

Paving.

Items.	Stone (364 squares).				Concrete (99 squares).			
	Quantity used.		Per square.		Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$85.24	....	$0.233	....	$30.77	....	$0.311
Stone.....tons..	1,100	2,508.00	3.022	6.890	....	....	....	....
Rope, manila.....pounds..	289	89.59	.794	.245	188	58.28	1.899	.588
Cement.....sacks..	....	....	....	....	690	317.40	6.970	3.206
Sand and gravel...cubic yards..	....	....	....	....	120	60.00	1.212	.606
Miscellaneous expenses	....	11.46	....	.032	....	6.10	....	.062
Subsistence	....	758.16	....	2.083	....	248.10	....	2.505
Steamboat expenses	....	55.97	....	.153	....	36.30	....	.366
Labor	....	735.85	....	2.022	....	261.39	....	2.640
Supervision	....	178.00	....	.490	....	98.40	....	.996
Total	....	4,422.27	....	12.148	....	1,116.74	....	11.280
Total field cost	....	4,422.27	....	12,148	....	1,116.74	....	11.280

Summary of costs.

	Subaqueous work.		Upper bank work.		Grand total.[1]
	Per square.	Total.	Per square.	Total.	
Total field cost	$14.297	$2,573.39	$14.501	$6,082.62	$8,656.01
Care of plant	.840	151.22	.893	370.23	521.45
Repair of plant	.732	131.69	.769	322.40	454.09
Depreciation of plant	2.833	510.08	2.987	1,248.83	1,758.91
Total	18.702	3,366.38	19.150	8,024.08	11,390.46

[1] All repair work, hence the cost per linear foot of bank protected can not be given.

Condition at the end of fiscal year.—The revetment generally throughout this bend is in excellent condition. There is, however, a small pocket cave about 800 feet above Hopefield Point which should be repaired during next season. Below the lower end of the revetment for a distance of about 1,200 feet some caving occurred during the rise of last February. This, however, does not need any immediate attention.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The bank and channel throughout Hopefield bend were fixed from the installation of the Hopefield work until 1912 when, as observed above, the river changed its course, breaking through between Hen and Chicken Islands. Any tendency or possibility of cut-off of the river by way of Hopefield Lake has been obviated and the harbor of the city of Memphis maintained.

Proposed operations.—Repairs to the small pocket cave referred to above are contemplated during the coming low water season.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*k*) *Memphis Harbor, Tenn.*

Location and description.—Two hundred and thirty to two hundred and thirty-two miles below Cairo, left bank.

Original condition.—The city of Memphis differs from most of the Mississippi River towns to the extent that it is not located on delta ground, but upon what have been known as the Chickasaw Bluffs. These bluffs being reasonably stable, the river front property of the town was constructed fairly close to the river bank. In the course of time, however, and during the early seventies, bank erosion set up and progressed to the point of endangering the town and its valuable river front improvements so that it became necessary to consider the installation of protective works such that the city would be guarded against property loss, its harbor maintained, and its river commerce assured.

Previous projects.—None.

Existing project.—The existing project, adopted in 1878, contemplated the protection of the Memphis Harbor front from further bank loss by the installation of spur dikes and woven willow revetment.

The formation of a sand bar which threatened to close the harbor to water-borne traffic led to the adoption of a project in 1917 which had for its object dredging and maintaining a navigable channel at the Memphis Wharf, keeping open the mouth of Hatchie River, and dredging Wolf River, and such other work as may be necessary in order to afford ample facilities for handling river-borne traffic.

Operations and results during the fiscal year.—Operations consisted in repairs to a small pocket cave just below the River and Rail incline, the maintenance of a channel along the paved wharf, dredging a channel through a sand bar in the Mississippi River near the entrance of the Loosa Hatchie River, dredging in Wolf River from the junction of that stream with the Loosa Hatchie River, and dredging in Loosa Hatchie River.

The repair work referred to above was accomplished by hired labor with Government plant from November 17, 1917 to December 6, 1917, at a cost of $7,600.71.

The following table gives detailed costs:

MEMPHIS HARBOR, TENN. (232 L.), FIRST AND SECOND DISTRICTS.

Mattresses, total area 257 squares (connecting mats, 100 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quanitty.	Cost.
Mobilization and demobilization		$128.07		$0.497
¼-inch strand ... pounds	600	41.70	2.335	.162
5/16-inch strand ... do	1,000	71.50	3.891	.278
⅜-inch strand ... do	1,500	114.45	5.836	.445
Wire, No. 9 ... do	1,150	43.36	4.475	.170
Staples ... do	40	1.26	.156	.005
Clips, ⅜-inch ... number	20	2.95	.078	.012
Brush and poles ... cords	434.8	760.90	1.690	2.960
Rope, manila ... pounds	678	210.18	2.634	.818
Miscellaneous expenses		7.79		.030
Subsistence		264.16		1.028
Labor		429.46		1.671
Supervision		94.80		.370
Total		2,170.58		8.446
Total field cost		2,170.58		8.446

BALLASTING AND SINKING.

Items.	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$24.80		$0.096
Stone ... tons	370	843.60	1.051	3.282
Rope, manila ... pounds	478	148.18	1.860	.577
Miscellaneous expenses		6.66		.026
Subsistence		149.10		.580
Labor		255.70		.995
Supervision		43.60		.170
Total		1,471.64		5.726
Total field cost		1,471.64		5.726

Grading (125 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Subsistence		$91.60		$0.733
Labor		201.80		1.614
Supervision		26.40		.211
Total		319.80		2.558
Total field cost		319.80		2.558

Paving (stone, 115 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$130.20		$1.132
Stone, tons	555.1	1,265.63	4.828	11.005
Rope, manila, pounds	289	89.59	2.513	.779
Miscellaneous expenses		11.05		.096
Subsistence		279.25		2.428
Labor		448.14		3.897
Supervision		97.60		.849
Total		2,321.46		20.186
Total field cost		2,321.46		20.186

Summary of costs.

Items.	Subaqueous work.		Upper bank work.		Grand total.[1]
	Per square.	Total.	Per square.	Total.	
Total field cost	$14.172	$3,642.22	$22.744	$2,641.26	$6,283.48
Care of plant	.588	151.22	.950	109.50	260.72
Repair of plant	.517	131.69	.822	95.36	227.05
Depreciation of plant	1.868	481.09	3.023	348.37	829.46
Total	17.145	4,406.22	27.539	3,194.49	7,600.71

[1] All repair work, hence the cost per linear foot of bank protected can not be given.

Dredging in Memphis Harbor was in operation at the time that the last annual report was submitted, but was suspended on June 15, 1917, on account of a rapid rise in the river; dredging was resumed on July 1, 1917, and continued until October 22, 1917, when the dredges were laid up; dredging was again resumed on May 6, 1918, and is in progress at the time of writing this report. Dredging a channel through a sand bar in the Mississippi River near the entrance of the Loosa Hatchie River was commenced on July 16, 1917, but was suspended on July 31, 1917. Operations were again resumed at various intervals from March 8, 1918, to May 25, 1918. Dredging in Wolf River with dipper dredge Northern No. 2 was commenced on October 1, 1917, and completed on October 31, 1917. Dredging in Loosa Hatchie River with dipper dredge was commenced on September 13, 1917, and completed on September 30, 1917.

Of the foregoing dredging operations, 117,000 cubic yards were dredged by hired plant, at a cost of $12,083.96, and 1,227,359 cubic yards were dredged by hired labor with Government plant, at a cost of $107,978.33.

Condition at the end of fiscal year.—The condition of all bank-protection work in the Memphis Harbor is excellent. The depth and width of the channel along the paved wharf is ample to take care of all river-borne traffic, but dredges will have to be used to maintain it.

Local cooperation.—The town of Memphis contributed to the bank protection work above described, $43,472.76.

Terminal facilities.—None.

Effect of improvement.—The town of Memphis has been relieved of the danger of property loss and its harbor maintained. The restrictions of the city's wharfage and river conveniences which existed at the end of the last fiscal year have been corrected by the Wolf River diversion canal and dredging along the paved wharf. In order to maintain the Memphis Harbor, dredging will probably have to be resorted to every low-water season.

Proposed operations.—It is proposed to continue dredging operations during the coming low-water season in the Memphis Harbor.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(1) *Norfolk, Miss.*

Location and description.—Two hundred and fifty-four miles below Cairo, left bank.

Original condition.—Active caving began at this place in 1916, and, before steps could be taken to stop it, breached the levee, which necessitated the construction of a levee loop by the local levee board. Caving continued at an alarming rate again threatening the levee system. To prevent a recurrence of the breaching of the levee, revetment protection was authorized, the cost of same to be borne jointly by the Federal Government and the local levee district.

Previous projects.—None.

Existing project.—Adopted in 1917; contemplates the construction of about 3,000 linear feet of standard revetment located in a most advantageous relation to the levee system.

Operations and results during the fiscal year.—Operations consisted in the installation of 1,004 feet of standard fascine channel mattress. Grading and paving along this stretch, however, has not been done. The necessary plant and material for the prosecution of the work arrived at Norfolk, Miss., from Old Town, Ark., on October 22, 1917, and work was commenced on November 1, 1917. Work was suspended on December 12 on account of abnormal weather and river conditions. No further work was done, and the outfit was towed to Memphis on February 20, 1918.

The foregoing operations were accomplished by hired labor with Government plant, at a total cost of $52,438.99.

The following table gives detailed costs:

NORFOLK, MISS. (254 L.) FIRST AND SECOND DISTRICTS.

Mattresses, total area 2,585 squares (channel mats., 97 per cent; connecting mats., 3 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$570.49		$0.221
½-inch strand .... pounds	15,677	1,089.56	6.061	.421
5/16-inch strand .... do	4,893	340.07	1.893	.132
¼-inch strand .... do	16,038	1,223.70	6.024	.473
Wire, No. 9 .... do	6,600	248.82	2.553	.096
Wire, silicon br .... do	243	7.65	.094	.003
Staples .... do	370	13.53	.143	.005
Clips, ½-inch .... number	1,203	134.73	.465	.052
Clips, 5/16-inch .... do	1,141	72.69	.441	.028
Brush and poles .... cords	2,434.4	4,260.20	.942	1.648
Rope, manila .... pounds	7,500	2,197.50	2.901	.850
Miscellaneous expenses		457.60		.177
Subsistence		7,067.90		2.734
Steamboat expense		5,289.94		2.045
Labor		8,072.23		3.123
Supervision		3,230.80		1.250
Total		34,277.41		13.260
Total field cost		34,277.41		13.260

BALLASTING AND SINKING.

Items.	Total quantity.	Total cost.	Quantity.	Cost.
Stone .... tons	1,168.9	$2,665.09	0.452	$1.031
Rope, manila .... pounds	5,000	1,465.00	1.934	.567
Miscellaneous expenses		271.02		.105
Subsistence		738.01		.286
Steamboat expense		661.34		.256
Labor		1,801.67		.696
Supervision		491.80		.190
Total		8,093.93		3.131
Total field cost		8,093.93		3.131

Summary of costs (1,004 linear feet revetted).

	Subaqueous work.		Grand total.[1]
	Per square.	Total.	
Total field cost	$16.391	$42,371.34	$42,371.34
Office expenses	.030	77.60	77.60
Surveys	.298	769.48	769.48
Care of plant	.706	1,825.06	1,825.06
Repair of plant	.615	1,589.32	1,589.32
Depreciation of plant	2.246	5,806.19	5,806.19
Total	20.286	52,438.99	52,438.99

[1] Total cost per linear foot can not be given on account of no upper bank work being done.

Conditions at the end of fiscal year.—Caving continues upstream from the upper end of the revetment. The work should be extended upstream for a distance of about 4,000 feet in order to fully protect the levee in this bend.

Local cooperation.—The Yazoo-Mississippi Delta Levee Board contributed $100,000 toward the cost of revetment work at this place.

Terminal facilities.—None.

Effect of improvement.—This work is only partially completed; when completed it will insure the integrity of the levee which is being threatened by the caving bank.

Proposed operations.—Grading and paving along the stretch of channel mattress referred to above and extension upstream for about 2,000 feet, with the available balance. A further upstream extension of about 2,000 feet will be required when the necessary funds become available.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*m*) *Star Landing, Miss.*

Location and description.—Two hundred and fifty-seven miles below Cairo, left bank.

Original condition.—Caving in Star Landing Bend had been persistently active for a number of years, to the extent that the adjacent levees were several times breached, necessitating the construction of some four levee loops. In 1912 and 1913 the rate of caving was such as to again seriously threaten the levee system, to guard against which revetment protection was authorized at the combined cost of the Federal Government and the local levee district.

Previous projects.—None.

Existing project.—Adopted in 1914; contemplates the construction of about 10,000 linear feet of standard fascine revetment, located in the most advantageous relation to the levee system.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—All revetment except about 3,000 feet destroyed is in excellent condition.

Local cooperation.—The Yazoo-Mississippi Delta Levee Board contributed to the cost of the work in place the sum of $210,000.

Terminal facilities.—None.

Effect of improvement.—Notwithstanding the destruction of about 3,000 feet of revetment, the integrity of the levees has been maintained. Abnormal currents developed in the river during the high water of 1917 which attacked and destroyed the work referred to above. The channel appears to be in a state of transition, due no doubt to changes in the bend above.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*n*) *Porter Lake, Ark.*

Location and description.—Two hundred and sixty-one miles below Cairo, right bank.

Original condition.—Prior to 1910 more or less intermittent caving had taken place in the vicinity of Porter Lake, though dangerous proximity to the Arkansas levee had not developed until about the year named. The importance of maintaining the existing levee line centers in the fact that a number of lakes are found in such relation thereto that a levee loop, which of necessity would have to be located behind the said lakes, would in consequence have been very extensive and costly. The alternative was, therefore, the construction of revetment to the end of holding the channel to position and of maintaining the existing levee line.

Previous projects.—None.

Existing project.—Authorized in 1911; contemplated the construction of standard fascine revetment to prevent further bank caving.

Operations and results during the fiscal year.—Operations consisted in the installation of 2,790 feet of standard fascine channel mattress with the necessary connecting mattresses. Paving along this stretch, however, has not been fully completed. The work was in progress at the time that the last annual report was submitted, but was suspended on June 9, 1917, on account of high water; operations were resumed on July 3, 1917, but were again suspended on January 10, 1918, on account of enormous ice flows and no work was done until March 16, 1918, when operations were resumed again and are still in progress.

The foregoing operations were accomplished by hired labor with Government plant, at a total cost of $196,406.94.

The following table gives detailed costs:

PORTER LAKE, ARK. (261 R.), FIRST AND SECOND DISTRICTS.

Mattresses, total area, 10,658 squares (channel mats, 64 per cent; connecting mats, 36 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$100.19	....	$0.010
½-inch strand ... pounds	41,160	2,781.62	3.682	.261
5/16-inch strand ... do	17,125	954.08	1.607	.090
¾-inch strand ... do	58,300	4,168.45	5.470	.391
Wire, No. 9 ... do	27,392	1,183.92	2.570	.111
Wire, silicon bronze ... do	1,172	240.26	.110	.023
Staples ... do	1,580	52.27	.148	.005
Clips, ½-inch ... number	2,940	391.26	.276	.037
Clips, 5/16-inch ... do	2,767	223.30	.259	.021
Brush and poles ... cords	13,941	25,099.04	1.308	2.355
Rope, manila ... pounds	10,000	2,930.00	.938	.275
Miscellaneous expenses	....	2,382.67	....	.223
Subsistence	....	16,206.17	....	1.520
Steamboat expenses	....	16,707.06	....	1.567
Labor	....	20,390.38	....	1.913
Supervision	....	6,576.03	....	.617
Total	....	100,386.70	....	9.419
Total field cost	....	100,386.70	....	9.419

BALLASTING AND SINKING.

Mobilization and demobilization	....	$34.07	....	$0.003
Stone ... tons	7,462.3	17,014.04	0.700	1.596
Rope, manila ... pounds	250.0	732.50	.234	.069
Miscellaneous expenses	....	434.21	....	.040
Subsistence	....	4,042.07	....	.380
Steamboat expenses	....	3,726.92	....	.350
Labor	....	5,160.05	....	.484
Supervision	....	1,372.80	....	.129
Total	....	32,516.66	....	3.051
Total field cost	....	32,516.66	....	3.051

Grading (3,564 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$55.89		$0.017
Rope, manila ... pounds	250.0	732.50	0.701	.205
Coal ... tons	276.6	979.10	.077	.276
Oil		9.45		.002
Miscellaneous expenses		238.28		.065
Subsistence		2,289.03		.642
Steamboat expenses		1,299.60		.366
Labor		4,912.18		1.378
Supervision		721.29		.202
Total		11,237.32		3.153
Total field cost		11,237.32		3.153

Paving stone (643 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$102.07		$0.159
Stone ... tons	2,120.4	4,834.51	3.300	7.519
Rope, manila ... pounds	250.0	732.50	3.888	1.139
Miscellaneous expenses		265.36		.413
Subsistence		2,859.69		4.447
Steamboat expenses		2,023.63		3.147
Labor		2,266.82		3.525
Supervision		1,027.72		1.598
Total		14,112.30		21.947
Total field cost		14,112.30		21.947

Summary of costs.

	Subaqueous work.		Upper bank work.		Grand total.[1]
	Per square.	Total.	Per square.	Total.	
Total field cost	$12.470	$132,903.36	$25.100	$25,349.62	$158,252.98
Office expenses	.141	1,505.94	.284	286.85	1,792.79
Surveys	.063	668.72	.126	127.38	796.10
Care of plant	.555	5,913.20	1.114	1,126.32	7,039.52
Repair of plant	.483	5,149.40	.970	980.81	6,130.24
Depreciation of plant	1.765	18,812.96	3.546	3,582.35	22,395.31
Total	15.477	164,953.58	31.340	31,453.36	196,406.94

[1] Total cost per linear foot can not be given on account of bank work not being completed.

Condition at the end of fiscal year.—Caving continues downstream from the lower end of the revetment. The work should be extended downstream for a distance of about 5,000 feet, and repairs should be made to some breaks in the paving which extend along the old revetment for a distance of about 2,000 feet beginning about 2,500 feet below the upstream end of the revetment, in order to fully protect the levee in this bend.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The revetment described has fixed the channel and has maintained a stable bank throughout the upper part of the Porter Lake

Bend. The adjacent levee has been protected. For continued similar results the portion of the lower work destroyed must be replaced and work extended downstream to cover the recent actively caving bank.

Proposed operations.—It is proposed to complete the paving along the stretch of work installed during this fiscal year with the available balance. A further extension downstream of 4,000 feet of revetment and repairs to the breaks in bank paving referred to above should be done as soon as necessary funds become available.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*o*) *Walnut Bend, Ark.*

Location and description.—Two hundred and eighty-one miles below Cairo, right bank.

Original condition.—Bank caving throughout Walnut Bend finally brought the Mississippi River into such relation to the St. Francis River as to suggest the danger of cutoff between the two. Moreover, the river bank had approached the Arkansas levee to the point that the latter was in imminent hazard of being breached, a condition that would have required the construction of an expensive levee loop. The combined situations, therefore, finally led, in 1907, to the necessity that Walnut Bend be protected by revetment.

Previous projects.—None.

Exsting project.—The existing project, initiated in 1907, provided for the installation of about 7,000 feet of standard fascine revetment, placed with relation to the adjacent levee, and with due regard to the possibility of cutoff between the Mississippi and St. Francis Rivers.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The entire length of revetment is in excellent condition. A resumption of active caving at the lower end of the bend is observed, though the existing revetment is not affected thereby. For several years past a deepening is noted at the outer edge of the downstream end of the work, though its extent is not sufficient to suggest any serious instability of the construction.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—Walnut Bend has been made stable throughout the length of its revetment; the adjacent levee has been safeguarded from destruction, and whatever danger of cutoff between the Mississippi and St. Francis Rivers may have existed has been eliminated.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*p*) *Trotters, Miss.*

Location and description.—Three hundred and four miles below Cairo, left bank.

Original condition.—For many years bank caving throughout Trotters bend was persistent, with the result that the river, in 1912, had attained hazardous proximity to the Mississippi Levee near the lower end of the bend. The estimated cost of a levee loop was such that the alternative of bank revetment was concluded upon.

Previous projects.—None.

Existing project.—Adopted in 1912; provides for controlling this bend and protecting the adjacent levee by the installation of continuous bank revetment.

Operations and results during the fiscal year.—An outfit arrived at Trotters, Miss., for making some minor repairs to upper bank paving and to a small pocket cave on December 8, 1917, but on account of abnormal weather and river conditions, work did not commence until January 5, 1918. Operations were again suspended on January 11, 1918, for the same reason, and the outfit towed to Memphis on February 8, 1918. Operations during the period from January 5 to 11, 1918, consisted in the building and sinking of a small connecting mattress, 48 squares in area, and grading 300 squares of bank.

The foregoing operations were accomplished by hired labor with Government plant, at a cost of $9,035.03.

The following table gives detailed costs:

TROTTERS, MISS. (304 L.), FIRST AND SECOND DISTRICTS.

Mattresses, total area, 48 squares. Connecting mats, 100 per cent.

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$125.00		$2.504
⅜-inch strand ... pounds	400	27.24	8.333	.567
5/16-inch strand ... do	600	42.90	12.500	.894
¼-inch strand ... do	450	38.33	9.375	.799
Wire, No. 9 ... pounds	260	9.83	5.417	.205
Staples ... do	15	.46	.313	.009
Clips, ⅜-inch ... number	10	1.48	.222	.031
Brush and poles ... cords	65	123.50	1.354	2.573
Miscellaneous expenses		21.00		.438
Subsistence		701.50		14.624
Steamboat expenses		1,350.00		28.125
Labor		926.40		19.300
Supervision		241.80		5.038
Total		3,609.44		75.197
Total field cost		3,609.44		75.197

BALLASTING AND SINKING.

Items.	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$60.00		$1.250
Stone ... tons	10	22.80	0.222	.475
Miscellaneous expenses		5.69		.119
Subsistence		213.03		4.438
Steamboat expenses		243.35		5.170
Labor		263.46		4.489
Supervision		98.70		2.057
Total		907.03		18.897
Total field cost		907.03		18.897

Grading (300 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$140.00		$0.467
Miscellaneous expenses		33.91		.113
Subsistence		1,000.58		3.333
Steamboat expenses		260.10		.867
Labor		1,347.45		4.492
Supervision		419.30		1.399
Total		3,201.34		10.671
Total field cost		3,201.34		10.671

Summary of costs.

	Subaqueous work.		Upper bank work.		Grand total.[1]
	Per square.	Total.	Per square.	Total.	
Total field cost	94.034	$4,516.47	10,671	$3,201.34	$7,717.81
Care of plant	2.977	142.81	.393	117.90	260.72
Repair of plant	2.740	131.69	.318	95.36	227.05
Depreciation of plant	10.023	481.09	1.161	348.37	829.45
Total	109.834	5,272.06	12.543	3,762.97	9,035.03

[1] All repair work, hence the cost per linear foot of bank protection can not be given.

Condition at the end of fiscal year.—The revetment, with the exception of the upper 1,500 feet, is in effective condition. Repairs should be made to the upper 1,500 feet during the coming season.

Caving continues throughout the upper part of the bend, and will probably require during the next few years an upstream extension of the work in place.

Local cooperation.—The Yazoo-Mississippi Delta Levee Board contributed $100,000 to the cost of the Trotters revetment.

Terminal facilities.—None.

Effect of improvement.—The lower end of the bend has been made stable; the confronting channel fixed, and the adjacent Mississippi River Levee maintained, thus eliminating the alternative necessity for the construction of a costly levee loop.

Proposed operations.—It is proposed to make repairs to the upper 1,500 feet of bank revetment referred to above during the coming low-water season. It is probable that an upstream extension of the existing work may be required within the next few years.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*q*) *Helena, Ark.*

Location and description.—Three hundred and six miles below Cairo, right bank.

Original condition.—The river bank in the vicinity of Helena during the eighties showed intermittent sloughs or settlements in the nature rather of vertical sinks than of the ordinary bank caving. The difference was recognized, as is evident from the statement regarding the low ground immediately behind the Helena levee which in 1888 was referred to as "a swamp * * * which seems to have been the most prolific cause of caving for some years past." To minimize the supposed effects of this swamp, it was proposed that this low ground should be drained by way of a canal to the south. By 1888 the settlements or sinks referred to had caused bank recession to the point of jeopardizing the property and industries of the town. These sinks or subsidences of greater or less extent continued to occur at irregular intervals till in 1913 the most extensive of all appeared.

Previous projects.—None.

Existing project.—The existing project was adopted in 1888 and contemplates the construction of fascine revetment and spur dikes along the Helena front to the extent necessary to make stable bank conditions in that locality.

In addition, by a special item in the river and harbor act of March 4, 1913, $100,000 was provided "to prevent a breach in the Helena front levee by revetment or otherwise."

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—During the past low-water season the foreshore has shown no evidence of instability.

Proposed operations.—None.

Recommended modifications of project.—None.

Effect of improvement.—The revetment work along the Helena front has protected the town and its industries to the south from encroachment by the river. It has not, however, provided against subsidence of the foreshore, the instability of which has reappeared at irregular intervals.

Local cooperation.—None.

Terminal facilities.—None.

The deposit of stable hill earth over the disturbed area is shown by borings to have forced out practically all underlying unstable material for a short distance, which suggests that continued, though indefinite fill, following further evidence of instability, may be expected to restore conditions of essential equilibrium.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*r*) *Delta, Miss.*

Location and description.—Three hundred and fifteen miles below Cairo, left bank.

Original condition.—Caving at this point, which had been active for a number of years, developed, in 1914, a condition of such menace to the controlling levee, located between the river bank and the foot of Moon Lake, as to require the revetment of the Delta Bend. The destruction of the levee would have necessitated the construction of a long and expensive loop around the said lake. To guard against such a contingency revetment protection was authorized at the combined cost of the Federal Government and local levee district.

Previous projects.—None.

Existing project.—The existing project adopted in 1915, contemplated the installation of about 9,000 feet of standard fascine revetment located in required relation to the levee system.

Operations and results during the fiscal year.—Operations consisted in making some minor repairs to a small break in the upper bank paving. The concrete bank paving outfit arrived at Delta on December 5, and work was commenced at once and finished on the 8th, when the outfit was towed to a safe ice harbor at Helena, Ark.

The foregoing operations were accomplished by hired labor with Government plant at a total cost of $1,312.95.

The following table gives detailed costs:

DELTA, MISS. (315 L.), FIRST AND SECOND DISTRICTS.

Paving (concrete, 60 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$111.75		$1.863
Cement ... sacks	500	230.00	8.333	3.833
Sand and gravel ... cubic yards	120	51.60	2.000	.860
Coal ... tons	9	40.50	.150	.675
Miscellaneous expenses		7.28		.121
Subsistence		156.92		2.615
Steamboat expenses		272.72		4.545
Labor		67.00		1.117
Supervision		111.75		1.863
Total		1,049.52		17.492
Total field cost		1,049.52		17.492

Summary of costs.

	Upper bank work.	
	Per square.	Total.[1]
Total field cost	$17.492	$1,049.52
Care of plant	.869	52.14
Repair of plant	.756	45.40
Depreciation of plant	2.765	165.89
Total	21.882	1,312.95

[1] All repair work, hence the cost per linear foot of bank protected can not be given.

Condition at the end of fiscal year.—The entire revetment is in excellent condition. The extension of the work downstream may be required at some future date.

Local cooperation.—The Yazoo-Mississippi Levee Board contributed $160,000 to the cost of the work.

Terminal facilities.—None.

Effect of improvement.—The channel in Delta Bend has been fixed throughout the stretch revetted, further bank caving prevented, and the necessity for the construction of a costly levee loop around Moon Lake obviated.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*s*) *Oldtown, Ark.*

Location and description.—Three hundred and twenty-four miles below Cairo, right bank.

Original condition.—Continued caving over a number of years prior to 1907 finally required, in that year, revetment of Oldtown Bend or the construction of a levee loop, the river bank having receded almost to the toe of the existing levee.

Previous projects.—None.

Existing project.—The existing project was adopted in 1907 and contemplated the installation of sufficient revetment to fix the channel and bank line throughout the bend and thus to protect the adjacent Arkansas levee.

Operations and results during the fiscal year.—Operations consisted in the installation of 2,484 feet of revetment and grading and paving the bank along this stretch. The work was in progress at the time that the last annual report was submitted, but was suspended on June 9, 1917, on account of high water; operations were resumed on July 5, 1917, and continued until the completion of the work on December 4, 1917. On October 21, 1917, the mattress plant and grading outfit was moved to Norfolk, Miss., leaving a bank paving plant to complete the upper bank work.

The foregoing operations were accomplished by hired labor with Government plant at a total cost of $141,446.21.

The following table gives detailed costs:

OLD TOWN BEND (324 R.) FIRST AND SECOND DISTRICTS.

Mattresses, total area, 8,579 squares (channel mats, 63 per cent; connecting mats, 37 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$373.13	....	$0.043
½-inch strands....pounds..	29,033	2,017.80	3.384	.235
5/16-inch strand....do....	15,951	873.03	1.859	.102
¼-inch strand....do....	41,118	3,137.30	4.792	.366
Wire No. 9....do....	21,448	980.58	2.500	.113
Wire, silicon brand....do....	785	160.93	.091	.019
Staples....do....	1,420	47.52	.166	.006
Clips, ½-inch....number..	1,946	217.95	.227	.025
Clips, 5/16-inch....do....	2,289	145.81	.266	.017
Brush and poles....cord..	9,695.2	16,966.61	1.130	1.978
Rope, manila....pounds..	2,140	627.02	.249	.077
Miscellaneous expenses	....	910.48	....	.105
Subsistence	....	6,175.13	....	.710
Steamboat expenses	....	8,194.14	....	.954
Labor	....	11,716.14	....	1.364
Supervision	....	2,674.84	....	.312
Total	....	55,218.41	....	6.436
Total field cost	....	55,218.41	....	6.436

BALLASTING AND SINKING.

Items.	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$68.72	....	$0.008
Stone....tons..	7,730.8	17,626.22	0.901	2.055
Rope, manila....pounds..	1,120	328.16	.131	.038
Miscellaneous expenses	....	84.49	....	.010
Subsistence	....	921.63	....	.108
Steamboat expenses	....	1,976.93	....	.230
Labor	....	3,752.72	....	.438
Supervision	....	757.22	....	.088
Total	....	25,516.09	....	2.975
Total field cost	....	25,516.09	....	2.975

Grading (3,470 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$28.15	....	$0.007
Rope, manila....pounds..	960	281.28	0.277	.081
Coal....tons..	292	1,250.00	.082	.361
Oil	....	25.69	....	.007
Miscellaneous expenses	....	237.46	....	.069
Subsistence	....	1,087.42	....	.312
Steamboat expenses	....	334.77	....	.097
Labor	....	2,852.85	....	.822
Supervision	....	555.84	....	.161
Total	....	6,653.46	....	1.917
Total field cost	....	6,653.46	....	1.917

Paving.

Items.	Stone (245 squares).				Concrete (4,583 squares).			
	Quantity used.		Per square.		Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization						$361.64		$0.079
Stone ... tons	741.4	$1,690.39	3.026	$6.899				
Rope, manila ... pounds	170	49.81	.694	.203	600	175.80	0.131	.038
Cement ... sacks					18,489	8,504.94	4.034	1.856
Sand and gravel ... cubic yards					5,735.8	2,478.68	1.252	.541
Coal ... tons					131	569.50	.029	.124
Oil						10.50		.002
Miscellaneous expenses		13.33		.054		82.77		.018
Subsistence		587.50		2.398		3,028.41		.661
Steamboat expenses		164.22		.671		2,952.48		.644
Labor		1,146.66		4.680		3,320.14		.725
Supervision		124.20		.508		1,710.24		.373
Total		3,776.11		15.413		23,195.05		5.051
Total field cost		3,776.11		15.413		23,195.05		5.051

Summary of costs (2,484 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost	$9.411	$80,734.50	$12.154	$33,624.62	$114,359.12	$46.04
Office expenses	.058	502.28	.077	215.26	717.54	.29
Surveys	.024	201.95	.032	86.55	288.50	.12
Care of plant	.421	3,613.62	.559	1,548.70	5,162.32	2.08
Repair of plant	.367	3,146.86	.484	1,348.65	4,495.51	1.81
Depreciation of plant	1.340	11,496.25	1.784	4,926.97	16,423.22	6.61
Total	11.621	99,695.46	15.090	41,750.75	144,446.21	56.95

Condition at the end of fiscal year.—The revetment is in excellent condition. A small break in the concrete bank pavement occurred in March, 1918, near the lower end of the work, which should be repaired during the coming low-water season.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The Arkansas Levee, adjacent to the upper end of Oldtown Bend, has been protected and the necessity for a costly substitute has been avoided.

Proposed operations.—Repairs to break in bank paving referred to above.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

(*t*) *Sunflower, Miss.*

Location and description.—Three hundred and fifty-five miles below Cairo, left bank.

Original condition.—Caving in Sunflower Bend, active for a number of years, finally brought the bank of the river practically to the toe of the Mississippi Levee, thus requiring that the latter be reconstructed, or that revetment be placed for its protection.

Previous projects.—None.

Existing project.—Initiated in 1911; provided for sufficient revetment to fix channel and bank conditions throughout the bend, thus making possible the retention of the adjacent levee.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—Sloughs have occurred in the bank in this bend to such an extent that to restore this work will require about 3,000 feet of revetment with the necessary grading and bank paving.

Local cooperation.—The Yazoo-Mississippi Delta Levee Board contributed to the cost of the work the sum of $92,500.

Terminal facilities.—None.

Effect of improvement.—The river channel and bank throughout Sunflower bend has been made generally stable, the adjacent levee guarded against destruction, and the construction of an extensive and costly levee loop has been avoided.

Proposed operations.—Repairs to the sloughs mentioned above, consisting of 3,000 feet of revetment, during the coming season as soon as the necessary funds become available, and the possible extension of the work downstream in the near future.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

First and second Mississippi River Commission districts—Data of cost of revetment June 1, 1917, to May 31, 1918.

Location.	Expended as per financial statement.	Credit by material on hand.	Total field cost.	Field unit cost.		Overhead unit cost.		Work accomplished.		Total cost of work.	Gross unit cost.[1]		Remarks.
				Per square.	Per linear foot.	Per square.	Per linear foot.	Square.[2]	Linear feet.		Per square.	Per linear foot.	
Gayoso Bend, Mo.	$135,631.84	$16,015.49	$116,934.16	$13.63	....	$3.69	....	7,847	2,200	$145,875.16	$18.59	....	Bank paving not completed.
Barfield, Ark.	146,558.50	13,601.00	131,234.61	12.42	....	2.91	....	10,563	2,822	161,936.35	15.33	....	Grading and paving not completed.
Hopefield Bend, Ark.	9,747.72	1,091.71	8,656.01	13.46	....	4.25	....	643	....	11,390.46	17.71	....	Repairs to existing works.
Memphis Harbor, Tenn.	6,611.47	327.99	6,283.48	16.89	....	3.54	....	372	....	7,600.71	20.45	....	Do.
Norfolk, Miss.	[3]50,000.00 [4]1,845.05 13,818.29	22,444.92	42,371.34	16.39	....	3.89	....	2,585	1,004	52,438.99	20.29	....	No upper bank work done.
Porter Lake, Ark.	[4]13,641.71 164,515.98	17,315.82	158,252.98	14.00	....	3.38	....	11,301	2,790	196,406.94	17.38	....	Bank paving not completed.
Trotters, Miss.	10,894.82	3,176.11	7,718.71	22.18	....	3.79	....	348	....	9,035.03	25.97	....	Repairs to existing works.
Delta, Miss.	[4]821.17 2,202.25	1,973.90	1,049.52	17.48	....	4.39	....	60	....	1,312.95	21.88	....	Do.
Old Town Bend, Ark.	[4]31,110.42 86,296.45	2,041.71	114,359.12	8.53	$46.04	2.02	$10.91	13,407	2,484	141,446.21	10.55	$56.95	

[1] Includes every item of field and overhead charges.

[2] Squares include both subaqueous and upper bank work.

[3] Amount expended from contributed funds from Upper Yazoo levee district of Mississippi.

[4] Amount expended for account of this work from allotment for "General repairs and stone."

II. EXPERIMENTAL REVETMENT.

From funds made available by the river and harbor bill approved July 27, 1916, the Mississippi River Commission allotted the sum of $150,000 for the construction of one complete unit with which to place subaqueous concrete revetment with a view of substituting this type of shore protection for the standard willow fascine type.

Work of procuring the necessary plant is in progress. Contract for the construction of a steel machinery barge has been let. Bids for a concrete mixing plant were invited but no satisfactory bids were received; bids will be again invited in the near future. The machinery, trusses, etc., for the operation of the plant have been completed by the Bucyrus Co., of South Milwaukee, Wis., and one slab barge at the Government fleet, Memphis, Tenn. It is hoped to have the unit completed in time to place some concrete revetment work before the end of the coming working season.

III. WOLF RIVER.

Location and description.—Two hundred and thirty miles below Cairo, left bank.

The work of improving Wolf River has been merged in the work of maintaining a navigable channel along the paved wharf of Memphis Harbor.

For description and previous history, see Annual Report, Chief of Engineers, 1916, Part III, page 3408.

IV. LEVEES.

General.—All levees are being constructed to the grade and section fixed by the Mississippi River Commission by resolution adopted April. 1914, which provides that the grade shall be 3 feet above the deduced confined flood of 1912, with section having a crown 8 feet wide, river slope 3 to 1, land slope 3 to 1 to from 5 to 8 below crown, and thence a banquette of varying widths from 20 to 40 feet, dependent on the height of the levee, with back slope of 4 to 1.

(a) *Upper St. Francis district.*

Location and description.—On the right bank of the river from Cape Girardeau, Mo., 54 miles above Cairo, to New Madrid, Mo., 70 miles below. This district comprises an area of about 700 square miles.

Original condition.—The United States made its first levee expenditure in this district in 1899. At that time there existed fragments of levees constructed by local boards and individual land owners, but nothing to be dignified as a levee system. The most important of these several detached lengths of levee were found between Commerce and the Iron Mountain Railroad, and from Birds Point for about 3 miles south. They merely joined the relatively higher ridges found variously along the upper St. Francis front and were capable of restraining only the mildest overflows.

Previous projects.—None.

Existing project.—The present project is to complete the levees to grade and section sufficient to protect the basin against overflow. This project was adopted in 1899. It has been modified from time to time, and at present contemplates the enlargement of the existing line, in cooperation with the State and local levee boards, to the grade and section adopted by the Mississippi River Commission April 19, 1914.

This levee line, when complete, will have a total length of about 87 miles.

Operations and results during the fiscal year.—There has been added during the year, under contract, 877,755 cubic yards, at a total cost of $157.637.24. Six and one-fifth miles of levee was enlarged and 1.1 miles of new levee extension completed, both to 1914 commission grade.

Contracts in force at the beginning of the year and those since executed are given in the following table, which includes a statement of the date, or percentage, of completion of each.

Location.	Class.	Miles from Cairo.	Cubic yards.	Price.	Contractor.	Completed May 31, 1918.
		Above.		*Cents.*		
20/16-22/0	Enlargement	26 R	122,349	21.00	R. L. Leonard	99 per cent.
22/0-24/0	do	24½ R	202,595	26.95	do	Com. Apr. 15, 1918.
24/0-26/15	do	23 R	177,435	21.00	do	67 per cent.
30/0-31/0	do	2 R	75,000	33.00	Walter L. Lee	None.
		Below.				
33/0-34/0	do	2 R	50,000	28.00	do	Do.
35/28-37/40	do	7 R	145,000	33.00	do	21 per cent.
42/6-43/10	do	13 R	71,046	35.00	Walter Lee	23 per cent.
67/45-76/0	New work	41-48 R	1,930,000	12.24	Oglesby Construction Co.	Annulled Sept. 8, 1917.
67/57-72/12	do	41-45 R	930,000	24.80	Roach, Stansell, Lowrance Bros. & Co.	36 per cent.

The Mississippi County levee district No. 1 contributed $45,000 on the work put under contract this season, which was their pro rata under the requirements of the flood-control bill approved March 1, 1917.

The Oglesby Construction Co. having failed on their contract for the construction of the Dorena extension from stations 67/45-76/0, the contract, under authority of the Chief of Engineers, was annulled September 8, 1917. This work was immediately advertised and a contract entered into with Roach, Stansell, Lowrance Bros. & Co., approved by the Chief of Engineers December 8, 1917, for a continuation of the work to the extent that funds were available. The result is shown in the last item of the above table.

The contractor took over the Oglesby tower drag-line machine, which has been doing splendid work, turning out from 60,000 to 65,000 yards per month, 10-hour shift, under the new management.

The prevailing shortage of labor has greatly interfered with the progress of all work.

Condition at the end of fiscal year.—This levee system completed to the present grade and section will involve an estimated total of 14,294,439 cubic yards, of which 51 per cent was completed at the end of the fiscal year.

There remains to be done 16 miles of extension, involving 4,390,080 cubic yards at the lower end of the system, and 2,655,301 cubic yards of enlargement and banquette construction. Total United States expenditure under this project to the end of the fiscal year was $1,056,167.57.

Local cooperation.—The local authorities have provided to date, in the construction of this levee system, about 2,188,836 cubic yards, at a total cost of $1,158,283.48.

In addition to the above, the following contribution was made in accordance with the provisions of the flood-control bill approved March 1, 1917: Mississippi County levee district No. 1, $45,000.

Effect of improvement.—Assured protection to about 660 square miles of territory against ordinary floods. As extension and enlargement proceed, an increasing area will be similarly benefited with final and absolute protection of the entire district, 700 square miles, against estimated maximum floods, upon the consummation of the project.

Proposed operations.—Construction of levee extension and enlargement to the extent and at the rate that funds are made available.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Summary of yardage in place.

Provided by—	In place May 31, 1917.	Added during year.	In place May 31, 1918.	Under contract May 31, 1918.	Required to complete.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
United States	4,384,620	877,755	5,262,375	947,754	7,035,381
Levee boards	1,996,683		1,996,683		
Total	6,381,303	877,755	7,259,058	947,754	7,035,381

Contracts in force.

Name of contractor.	Amount and character of work (levee work).	Price per unit.	Date of approval.	Date of beginning work.	Date of expiration.	Percentage of completion.
	Cu. yds.	*Cents.*				
R. L. Leonard	122,349	21.00	Oct. 25, 1916	Nov. 9, 1916	Dec. 31, 1917	99.0
Do	177,435	21.00	.....do	.....do	.....do	67.0
Walter L. Lee	75,000	33.00	Oct. 11, 1917	Oct. 29, 1917	Dec. 31, 1918	
Do	50,000	33.00	.....do	.....do	.....do	
Do	145,000	28.00	.....do	.....do	.....do	21.0
Walter Lee	71,046	35.00	Nov. 15, 1917	Nov. 21, 1917	.....do	23.4
Roach, Stansell, Lowrance Bros. & Co	930,000	24.80	Dec. 8, 1917	Dec. 28, 1917	Dec. 31, 1919	36.3

(b) *Reelfoot district.*

Location and description.—This district is on the left bank of the river, extending from Hickman, Ky., 36 miles below Cairo, to upper Slough Landing Neck, Tenn., about 80 miles below Cairo. The levee system is continuous for a length of 21 miles, and protects about 310 square miles of territory.

Original condition.—The United States initiated levee work in the Reelfoot district in 1902. At that time the basin was open, with the exception that local authorities had constructed a levee from the Kentucky-Tennessee State line south to Slough Landing, a distance of about 4½ miles.

Previous projects.—None.

Existing project.—The original project provided for the construction of a levee from the Hickman Bluffs south to the upstream end of the levee provided prior to 1902 by local authorities and the enlargement of the system to grade and section sufficient to protect the basin against overflow. This project was adopted in 1902. It has been modified from time to time, and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to the grade and section adopted by the Mississippi River Commission April 19, 1914.

Operations and results during the fiscal year.—There has been added during the year, under contract, 169,347 cubic yards, at a total cost of $47,018.34. One and three-tenths miles of levee was enlarged to the 1914 Mississippi River Commission grade.

Contracts in force at the beginning of the year and those since executed are given in the following table, which includes the date of completion:

Location.	Class.	Miles below Cairo.	Cubic yards.	Price.	Contractor.	Completed.
				Cents.		
2/37-4/36	(1)	39 L	102,981	16.00	Roach, Stansell, Lowrance Bros. & Co.	July 31, 1917
15/0-16/0	(2)	50 L	67,137	29.70	W. E. Bondurant	Sept. 14, 1917

[1] New work.

[2] Enlargement.

The Fulton County Levee Board contributed $5,000 on the enlargement contract as required under the terms of the flood-control bill approved March 1, 1917.

Conditions at the end of the fiscal year.—This levee system completed, to the present grade and section, will involve an estimated total of 4,028,000 cubic yards, of which 72 per cent was completed at the end of the fiscal year.

There remains to be done 1,139,285 cubic yards of enlargement and banquette work. Total expenditure under this project to the end of the fiscal year, $395,000.

Local cooperation.—Local interests have thus far contributed a total of 861,204 cubic yards, at a cost of $386,728.90, which includes all cost of actual construction, maintenance, high water expense, charges for right of way, general administration, etc. In addition to the above the local board contributed $5,000 on work last season under the provisions of the flood-control bill approved March 1, 1917.

Effect of improvement.—The construction thus far accomplished affords assured protection from ordinary floods to the entire basin. As the system is progressively strengthened to completion, increased protection against overflow will be provided.

Proposed operations.—Continuation of levee enlargement and banquette construction to the extent and at the rate that funds are made available.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Summary of yardage in place.

Provided by—	In place May 31, 1917.	Added during year.	In place May 31, 1918.	Under contract May 31, 1918.	Required to complete.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
United States	1,858,164	170,118	2,028,282		1,139,285
Levee boards	861,204		861,204		
Total	2,719,368	170,118	2,889,486		1,139,285

(*c*) *Lower St. Francis district.*

Location and description.—On the right bank of the river from just below New Madrid, Mo., 79 miles below Cairo, to the mouth of the St. Francis River, 298 miles below Cairo. Within the limits defined, the lower St. Francis levee, is continuous for a length of 211 miles. About 3,500 square miles of territory are protected.

Original condition.—When the United States assumed levee interest in the lower St. Francis district there existed along its front detached fragments of levee, constructed by local boards and private land owners, to guard against inflow through the swales and low places along the river bank. This condition had not assumed shape as a levee system and was not expected to resist anything more than "out of bank water."

Previous projects.—None.

Existing project.—The existing project was adopted in 1887 when 22 miles of levee were provided for, extending from Bear Bayou to Craighead Point, in connection with the improvement of Plum Point Reach. The project contemplates the construction and enlargement of the levees to a grade and section sufficient to protect the basin against overflow. It has been modified from time to time, and at present provides for the enlargement of the existing levee line in cooperation with the State and local levee boards to the grade and section adopted by the Mississippi River Commission April 19, 1914.

Operations and results during the fiscal year.—There has been added during the year, under contract, 1,353,696 cubic yards, at a total cost of $394,422.57. Ten and four-tenths miles of levee was enlarged, and 6.9 miles of banquette constructed, both to the 1914 Mississippi River Commission grade and section.

Contracts in force at the beginning of the year and those since executed are given in the following table, which includes a statement of the date, or percentage, of completion of each:

Location.	Class.	Miles below Cairo.	Cubic yards.	Price.	Contractor.	Completed May 31, 1918.
				Cents.		
41/0–48/4	Banquette	125 R	300,000	25.00	Roach, Stansell, Lowrance Bros. & Co.	60 per cent.
48/4–49/49	New Work	130 R	400,000	18.50	Rodgers Bros	Completed Oct. 3, 1917.
83/30–87/14	Enlargement	175 R	250,000	30.00	Roach, Stansell, Lowrance Bros. & Co.	None.
93/15–96/8	do	176 R	180,000	25.00	do	64 per cent.
97/20–101/0	do	188 R	196,266	26.00	R. L. Leonard	Completed Oct. 22, 1917.
130/0–140/29	Banquette	210 R	798,408	29.50	Roach, Stansell, Lowrance Bros. & Co.	32 per cent.
145/6–146/15	Enlargement and banquette.	225 R	528,000	21.80	Yale & Reagan	Completed Dec. 6, 1917.
146/15–147/8	do	225 R	227,8966	17.50	Roach, Stansell, Lowrance Bros. & Co.	48 per cent.
157/19–160/0	Enlargement	247 R	277,000	26.00	R. L. Leonard	63 per cent.
168/20–169/30	do	250 R	128,000	45.00	Roach, Stansell, Lowrance Bros. & Co.	68 per cent.
171/32–173/0	do	325 R	152,000	28.00	H. B. Blanks	43 per cent.
173/0–179/0	do	253–259R	490,000	22.00	do	14 per cent.
179/0–180/0	do	260 R	106,700	30.00	do	35 per cent.

The Yale & Reagan contract for enlargement and banquette from stratums 145/6 to 146/15, was completed December 6, 1917; that is, the contractor had at that time placed the original estimated yardage, 440,000, plus the 20 per cent as provided for in paragraph 20 of the specifications. The yardage increase over the original estimate was due to a general subsidence of levee foundation which was still in progress when the contractor had fulfilled his contract obligation. The contract was, therefore, terminated and the work continued under a plant rental, and a cost plus a percentage basis (E. D. 98204/9, Nov. 5, 1917), and it is still being prosecuted under that plan. The foundation trouble continues, however, and it is impossible to predict a date of completion.

The shortage of labor is very seriously hindering progress.

Practically all contract work in this district was discontinued in February, last, when the contractor's forces were moved to powder plant construction at Nashville, Tenn., and the nitrate plant construction at Sheffield, Ala. At the time when these forces went away it was expected that they would be gone from 60 to 90 days, but on account of increases made in the original project, the work could not be completed within the estimated time, and upon a presentation of the facts to the Mississippi River Commission on its April inspection trip by a committee representing the contractors, the commssion granted them a further leave of absence until July 1, 1918.

The following contributions were made in accordance with the flood-control bill approved March 1, 1917:

Lower St. Francis Levee Board of Missouri	$22,000
Lower St. Francis Levee Board of Arkansas	225,500
Total	247,500

Condition at the end of the fiscal year.—This levee system completed, to the present grade and section, will involve an estimated total of 52,009,000 cubic yards, of which 87 per cent was completed at the end of the fiscal year. There remains to be done 6,494,744 cubic yards of enlargement and banquette. Total United States expenditure under this project to the end of the fiscal year was $4,124,695.69.

Local cooperation.—The local authorities have provided to date, in the construction of this levee system, about 25,947,931 cubic yards at a total cost of $10,246,600.39.

In addition to the above, the following contributions were made in accordance with the flood-control bill approved March 1, 1917:

Lower St. Francis levee district of Missouri	$22,000
Lower St. Francis levee district of Arkansas	225,500
Total	247,500

Effect of improvement.—Practically the entire basin is protected from overflow against ordinary floods.

Proposed operations.—Continuation levee enlargement and banquette construction to the extent and at the rate that funds are made available.

Recommended modificaions of project.—None.

Reference to published articles not previously reported.—None.

Summary of yardage in place.

Provided by—	In place May 31, 1917.	Added during year.	In place May 31, 1918.	Under contract May 31, 1918.	Required to complete.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
United States	18,212,629	1,353,696	19,566,325	1,817,610	6,494,744
Levee boards	25,656,513	291,418	25,947,931		
Total	43,869,142	1,645,114	45,514,256	1,817,610	6,494,744

Contracts in force.

Name of contractor.	Amount and character of work (levee work).	Price unit.	Date of approval.	Date of beginning work.	Date of expiration.	Percentage of completion.
	Cubic yards.	*Cents.*				
Roach, Stansell, Lowrance Bros. & Co.	300,000	25.00	Oct. 9, 1917	Oct. 25, 1917	Dec. 31, 1918	60.0
Do.	250,000	30.00	do.	do.	do.	0
Do.	180,000	25.00	do.	do.	do.	63.9
Do.	798,408	20.50	do.	do.	do.	31.8
Do.	227,896	17.50	July 14, 1915	July 24, 1915	Dec. 31, 1916	48.5
R. L. Leonard	277,000	26.00	Oct. 9, 1916	Oct. 24, 1916	Dec. 31, 1917	63.0
Roach, Stansell, Lowrance Bros. & Co.	128,000	45.00	Oct. 9, 1917	Oct. 25, 1917	Dec. 31, 1918	68.0
H. B. Blanks	152,000	28.00	Oct. 6, 1917	do.	do.	43.1
Do.	490,000	22.00	Oct. 8, 1917	do.	do.	14.0
Do.	100,700	30.00	Oct. 6, 1917	do.	do.	35.0

(*d*) *Upper Yazoo district.*

Location and description.—This district is on the left bank of the river and comprises the upper end of the State of Mississippi, from 244 to 365 miles below Cairo. The district's area is about 3,281 square miles.

Original condition.—The Mississippi River Commission first undertook levee work in this district in 1882, following the disastrous flood of that year. At the time of this flood the Upper Yazoo Levee line was continuous from the Chickasaw Bluffs below Memphis, south for a distance of about 117 miles. The line, however, was largely a coordination of plantation levees ununiform as to grade and section, and described at the time as being merely "up to low grade."

Previous projects.—None.

Existing project.—The existing project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time, and at date contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to the grade and section adopted by the Mississippi River Commission April 19, 1914.

Operations and results during the fiscal year.—The United States made no levee expenditures in the Upper Yazoo district during the year.

The levee board added to the system 604,958 cubic yards; total expenditure, $594,965.44.

Condition at the end of the fiscal year.—This levee system completed, to the present grade and section, will involve an estimated total of 41,632,000 cubic yards, of which 93 per cent was completed at the end of the fiscal year. There remains to be done 2,920,650 cubic yards of enlargement. Total United States expenditure under the project to the end of the fiscal year, $1,468,703.45.

Local cooperation.—The Upper Yazoo Levee Board has expended to date a total of $13,560,192.13, which comprehends all cost of construction, maintenance, high-water expenditures, right of way, administration, etc. It does not appear probable that the United States will expend any addiional funds on this project.

Effect of improvement.—The Upper Yazoo Basin has been made entirely safe against all floods, except, perhaps, the extremest. In the event of the latter vigorous emergency work will, in all likelihood, prevent crevasse of the system or overflow of the basin.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Summary of yardage in place.

Provided by—	In place May 31, 1917.	Added during year.	In place May 31, 1918.	Under contract May 31, 1918.	Required to complete.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
United States	7,686,756		7,686,756		2,920,650
Levee boards	30,419,636	604,958	31,024,594	379,778	
Total	38,106,392	604,958	38,711,350	379,778	2,920,650

(e) *White River district.*

Location and description.—On the right bank of the river from Helena, Ark., to and including a part of Laconia Circle, from 306 to 385 miles below Cairo The area of the basin amounts to 910 square miles.

Original condition.—The first expenditure of the United States in the White River district was made in 1887, at which time it is stated that 30 miles of levee "built to low grade" were in existence. These 30 miles presumably comprised a stretch of levee from Helena south, another from the vicinity of Laconia north, and such intermediate plantation levees as were considered to be of any value.

There is no reliable record of the location, or condition of the White River levees at the time in question. It is reported that the entire basin was overflowed in the floods of 1882, 1883 and 1884, but that about 400 square miles were unaffected by the flood of 1886.

Previous projects.—None.

Existing project.—The existing project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1887. It has been modified from time to time, and at present contemplates the enlargement of the existing levee line in cooperation with the State and local boards to the grade and section adopted by the Mississippi River Commission April 19, 1914.

Operations and results during the fiscal year.—There has been added during the year, under contract, 635,368 cubic yards, at a total cost of $217,543. Nine-tenths of a mile of levee was enlarged and 1.7 miles of new levee and banquette constructed, both to the 1914 Mississippi River Commission grade.

Contracts in force at the beginning of the year and those since executed are given in the following table, which includes a statement of the date, or percentage, of completion of each:

Location.	Class.	Miles below Cairo.	Cubic yards.	Price.	Contractor.	Date of completion and per cent completed May 31, 1918.
				Cents.		
30/28–31/18...	New work.....	337 R	250,000	21.30	Rodgers Bros...........	Sept. 7, 1917.
32/0–34/0.....	Enlargement..	340 R	284,000	18.20	.....do...................	Nov. 3, 1917.
34/0–36/0.....	.....do.........	342 R	300,000	18.20	.....do...................	Dec. 1, 1917.
36/0–37/0.....	.....do.........	344 R	150,000	29.70	.....do...................	41 per cent.
52/48–53/30...	New work.....	370 R	260,000	40.00	R. T. Clark & Co........	May 31, 1917.
61/39–62/15...	.....do.........	383 R	133,000	35.00	Roach, Stansell, Lowrance Bros. & Co.	Feb. 25, 1918.

The Laconia levee district No. 1 contributed, under the provisions of the flood-control bill approved March 1, 1917, $55,000, on the construction of the two loops shown in latter part of the above table.

Conditions at the end of the fiscal year.—This levee system, completed to the present grade and section, will involve an estimated total of 28,511,000 cubic yards, of which 59 per cent was completed at the end of the fiscal year. There remains to be done 11,641,045 cubic yards of levee enlargement and banquette. Total United States expenditure under this project to the end of the fiscal year was $3,039,883.34.

Local cooperation.—The local authorities have provided to date, in the construction of this levee system, about 4,404,438 cubic yards, at a total cost of $1,890,127.91.

In addition to the above, the Laconia levee district No. 1 contributed $55,000 under the provision of the flood-control bill approved March 1, 1917.

Effect of improvement.—The White River Basin may be assumed to be fully protected only against moderate floods. Increased protection will accrue at the rate and to the extent that future expenditures provide for the increase of grade and section toward the standards established by the Mississippi River Commission.

Proposed operations.—Continuation of levee enlargement and banquette construction to the extent and at the rate that funds are made available.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Summary of yardage in place.

Provided by—	In place May 31, 1917.	Placed during year.	In place May 31, 1918.	Under contract May 31, 1918.	Required to complete.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*
United States	11,830,149	635,368	12,465,517	94,869	11,641,045
Levee boards	4,222,514	181,924	4,404,438	....	
Total	16,052,663	217,292	16,869,955	94,869	11,641,045

Contracts in force.

Name of contractor.	Amount and character of work (levee work).	Price per unit.	Date of approval.	Date of beginning work.	Date of expiration.	Percentage of completion.
	Cu. yds.	*Cents.*				
Rodgers Bros	160,000	29.70	Oct. 21, 1916	Nov. 8, 1916	Dec. 31, 1917	40.7
R. T. Clark & Co	279,315	40.00	Emergency	Oct. 1, 1917	Dec. 31, 1918	99.9

V. SURVEYS.

The annual surveys were made between August 4, 1917, and April 24, 1918. Surveys were made over all existing revetments, consisting of soundings taken on fixed ranges 200 feet apart for comparison with former and future surveys, and bank lines were secured in caving bends, to the end of compiling information as to their future revetments or other requirements.

Revetment surveys.—Columbus, Ky. (21 L.); Hickman, Ky. (36 L.); Slough Landing Neck, Tenn. (58–61 L.); New Madrid, Mo. (71 R.); Gayoso Bend, Mo. (106 R.); Caruthersville, Mo. (110 R.); Barfield, Ark. (141 R.); Plum Point Reach, Ark. and Tenn. (147–168 L. and R.); Golden Lake, Ark. (192 R.); Hopefield Bend, Ark. (227 R.); Memphis Harbor, Tenn. (230–232 L.); Norfolk, Miss. (254 L.); Star Landing, Miss. (257 L.); Porter Lake, Ark. (261 R.); Walnut Bend, Ark. (281 R.); Trotters, Miss. (304 L.); Helena, Ark. (306 R.); Delta, Miss. (315 R.); Old Town, Ark. (324 R.); Sunflower, Miss. (355 L.).

Bank line surveys.—Lucas Bend, Mo. (14–18 R.); Beckwiths Bend, Mo. (30–33 R.); Hickman Bend, Ky. (35–41 L.); bend of Island 8, Mo. (44–50 R.); Slough Landing Neck, Tenn., Ky., and Mo. (58–70 L. and R.); New Madrid Bend Mo., and Point Pleasant Reach, Mo. (70–85 R.); Stewarts Landing, Mo. (90–93 R.); Bells Point, Mo. (112 R.); foot of Island 17, Mo. (118–120 R.); Huffman, Ark. (128–133 R.); chute of Island 26, Tenn. (147–153 L.); Ashport Bar, Mo. (153–157 R.); chute of Island 30, Tenn. (157–162 L.); bend of Island 35, Ark. (187–196 R.); St. Claire, Ark. (220–223 L.); Old Hen Island, Tenn. (224–225 L.); Hopefield Point, Ark., to Wyanoke, Ark. (230–240 R.); Graves Bayou, Ark., to Cat Island, Ark. (250–254 R.); Mhoons Bend, Miss. (275–280 L.); Fox Island Bend, Miss. (285–290 L.); Hardins Point, Ark. (290–291 R.); O. K. Bend, Miss. (291–295 L.); St. Francis Bend, Ark. (293–298 R.); Friar's Point, Miss. (317–320 L.); Dawson, Ark., to Offuts, Ark. (343–346 R.); Sunflower Bend, Miss. (357–360 L.); Laconia, Ark. (377–379 R.).

VI. PLANT.

Operations during the fiscal year.

New plant.—The following items of plant were added during the year at the costs indicated:

Nos. 1701 to *1707*, inclusive, creosoted, wooden material barges under construction at the time that last annual report was submitted; completed during the year at a cost of	$1,881.77
Nos. 1708 and *1709*, cresoted, wooden flats under construction at the time that last annual report was submitted; completed during the year at a cost of	418.35

Nos. 1711 to *1713*, inclusive, creosoted, wooden concrete mattress barges (under construction). Construction cost during the year		$7,398.00
Nos. 1714 to *1719*, creosoted, wooden sand barges (under construction). Construction cost during the year		32,606.01
No. 1801, hydraulic sand and gravel digger (under construction). Construction cost during the year		872.58
Northern No. 2, dipper dredge (by purchase)	$55,000.00	
Nos. 1 and *2*, dump scows (by purchase)	10,000.00	
		[1] 65,000.00
Nos. 5, 6, and *7*, skiffs (by purchase)		120.00
Tools and appliances, outfits, etc		14,207.54
Unexpended material on hand		58,600.68
Total		181,099.93

Plant decreased.—The plant has been decreased during the year by the following items:

Dropped on affidavit: Model barge *No. 214*, decked barges *Nos. 9315* and *9325*, steamer *Minnetonka*, steamer *Graham*, hydraulic grader *No. 1022*, quarterboat *No. 206*, skiffs *Nos. 13* and *14*.

To be dropped on affidavit: Model barges *Nos. 131* and *135*, decked barges *Nos. 1008* and *1703*, mooring barge *No. 1*.

Repairs to plant.—Repairs to the following items of plant have been made during the year at the costs indicated:

Steamer *Minnetonka:* Hull received minor repairs and was calked several times to prevent sinking (sunk during the year; property salvaged)	$1,875.99
Steamer *Wynoka:* Three new rudders, ice cans, and brine tank expansion coils purchased; new ice box built; furnace walls rebuilt; repairs to pitman, wheel, steam capstan, and steam lines; general running repairs	4,562.29
Steamer *Chisca:* New exhaust pipe built and installed; repairs to pumps, nigger boiler, steam capstan, doctor, fantail and rudders; general running repairs	875.29
Steamer *Graham:* New stacks built and installed; feed pumps repaired; new wheel stock built; general running repairs (sunk during the year)	763.25
Steamer *Search:* Roof renewed; fantail and guards repaired; machinery and stoves overhauled; general running repairs	1,431.07
Steamer *Itasca:* Repairs to capstan, rudders, towing fenders, feed pump, steam line, wheel, and roof; furnace walls rebuilt and machinery repaired; general running repairs	567.38
Steamer *Augustus J. Nolty:* Head log rebuilt twice, new wrist pin built and installed; new tow and swinging fenders built; air pump rebushed; machinery repaired; general running repairs (sunk and hull recovered)	1,250.00
Steamer *W. M. Rees:* Repairs to boiler breeching, feed and condenser pump, cylinder head, wheel, and fantail; general running repairs	975.09
Steamer *Maud Kilgore:* Repairs to wheel; general running repairs	475.00
Steamer *Mercury:* Repairs to wheel, rudders, pitmans, and capstans; general running repairs	275.00
Steamer *Saturn:* Repairs to boiler room bulkhead	125.00
Dredge *Iota:* New stretcher bars built; repairs to feed pump and boilers	175.00
Dredge *Kappa:* New stretcher bars built; repairs to feed pumps, main pump, pontoon chains, valves, sheaves, and cables and pontoons	225.00
Dredge *Gamma:* Minor repairs to machinery	79.40
Dredge *Zeta:* New fire tools built	33.20
Hydraulic grader *No. 1022:* New set of repair parts for pump purchased (sunk during the year)	971.85
Hydraulic grader *No. 1205:* Toilet room and bathroom installed; new stage plank built; repairs to machinery, boilers, and breeching; new set of repair parts for pumps purchased	2,486.62

---

[1] Paid for from allotment for Memphis Harbor.

Hydraulic grader *No. 1401:* New pump plungers built; minor repairs to machinery; new set of parts purchased for pumps	$1,275.48
Sand and gravel digger *No. 1407:* Rakes calked; cabin repaired; boiler and machinery overhauled; discharge water box repaired and calked	412.51
Concrete mixing plant *No. 1208:* New sand chute, bumper, and new elevator pivot shaft built; repairs made to boom and boiler house. New sprockets and elevator buckets purchased; machinery overhauled; docked on dredge fleet ways and hull scraped and painted	1,958.11
Derrick boat *No. 3:* Guards and rakes repaired and calked; new steam pipe installed; boom repaired and fitted with new cable	875.50
Derrick boat *No. 1017:* Installed new piston rods on hoist; feed pump overhauled	164.00
Derrick boat *No. 1411:* Guards repaired and calked; rakes calked; machinery overhauled; boom repaired and new cable put on; general running repairs	735.00
Pile driver No. 4: Received minor repairs to cabin	18.40
Northern No. 2: Boom, dipper, and dipper handle received extensive repairs	1,720.00
Machine shop No. 1: Guards, sides, and rakes repaired and calked; new stack and new furnace walls built; repairs made to boiler feed pump and machinery from time to time	625.64
Boiler shop No. 0806: Rakes repaired and calked; boiler repaired and flues rolled; repairs made to air compressor at various times	175.00
Floating dock: Gates and valves repaired	192.03
Locomotive crane: Flues renewed in boiler; driving gears repaired; general repairs	875.50
Creosote tanks: Tanks repaired; heating pipes taken out and refitted; old boiler repaired; new boiler installed and a new boiler house erected; minor repairs	325.28
Launch Opelika: New toilet installed; cabin screened; docked three times and hull repaired and painted; propellers and shafts taken out and straightened; machinery overhauled; shaft boxes, timing gears, and piston rings repaired; new propellers purchased; general running repairs	1,825.00
Coal loader No. 9309: Received minor repairs to deck	3.15
Quarterboat No. 2: Received minor repairs to cabin	74.70
Quarterboat No. 3: Received repairs to roof	45.40
Quarterboat No. 5: Received minor repairs to cabin	36.20
Quarterboat No. 6: Renewed pump valves and suckers; minor repairs	75.20
Storeboat No. 8: Sides and rakes repaired and calked; guards and deck repaired and calked; new floor laid in office	853.65
Storeboat No. 12: Sides and rakes repaired and calked; deck repaired; new timberheads put in	123.00
Quarterboat No. 25: Repairs made to side of hull	72.00
Carpenter shop boat No. 26: Sides and rakes repaired and calked; new capstans and timberheads installed; minor repairs	179.20
Quarterboat No. 27: Ice box rebuilt; stoves and ranges, stove pipes, and plumbing overhauled	235.40
Quarterboat No. 0601: Docked; old part of hull rebuilt; deck and cabin repaired	975.72
Quarterboat No. 206: Repairs to stoves and ranges; rakes and guards calked; sunk during year	238.50
Quarterboat No. 221: Received repairs to stoves and ranges; rakes, sides, guards, and deck repaired and calked	175.00
Quarterboat No. 1020: Stoves and ranges repaired; portable bulkhead built in dining room; cabin and deck repaired	163.45
Quarterboat No. 1021: Stoves and ranges overhauled; rakes calked	75.00
Quarterboat No. 1301: Stoves, ranges, and cabin carlins repaired; cabin interior changed; plumbing overhauled	786.63
Quarterboat No. 1402: Stoves, ranges, and cabin carlins repaired; new fenders installed; rakes calked	727.79
Scow dump No. 1: Docked; bottom, rakes, and sides repaired and calked; deck and mud pockets repaired	275.34

Scow dump No. 2: Docked; bottom, rakes, and sides repaired and calked; deck and mud pockete repaired	$275.34
Barge mattress No. 1501: Repairs made to platform and ways	135.00
Barge mattress No. 1502: Repairs made to platforms and fingers	105.25
Barge mooring No. 1223: Boiler repaired to install on barge	325.50
Barge model No. 128: Docked; bottom, sides, and heads patched and calked	225.00
Barge model No. 137: Docked; bottom, sides and heads patched and calked	300.00
Barge No. 0802: Docked; end rebuilt, bottom repaired; both rakes calked	271.30
Barge No. 0903: Rakes calked afloat	2.10
Barge No. 1001: Rakes calked afloat	75.00
Barge No. 1002: Rakes patched and calked afloat	34.35
Barge No. 1004: Deck house extended over full length of barge; rakes calked and patched	479.88
Barge No. 1005: Rakes calked afloat	60.00
Barge No. 1008: Sunk; material assembled for raising barge started and stopped by high water	490.25
Barge No. 1101: Docked; bottom and rakes calked	72.30
Barge No. 1202: Docked; hull scraped and painted	76.42
Barge No. 1209: Docked; hull scraped and painted	81.75
Barge No. 1217: Hole in side patched	15.20
Barge No. 1219: Docked; hull scraped and painted	120.00
Barge No. 1220: Rakes calked afloat	18.00
Barge No. 1302: Sides patched and calked	98.20
Barge No. 1304: Rakes patched and calked	47.00
Barge No. 1306: Rakes calked afloat	67.20
Barge No. 1308: Rakes patched and calked afloat	65.62
Barge No. 1317: Docked; rake repaired; hull scraped and painted	395.40
Barge No. 1406: Rakes repaired and calked	260.00
Barge No. 1409: Rake patched	14.20
Skiffs: General repairs	75.00
Calking flat No. 1: Rebuilt	75.00
Miscellaneous: Repairs were made to tools and appliances at various times for construction parties, and fleet use; repairs to ranges, stoves, wheelbarrows, pumps, and furniture	1,275.95
Total	37,977.44
Repair material on hand	1,855.18
Total repairs	39,832.62

The following shows the original cost, the repair, and depreciation during the year, and the present estimated value of all plants employed in the first and second Mississippi River Commission districts:

Name.	No.	Original cost.	Valuation last year.	Repairs.	Depreciation.	Present estimated value.
Barge, model:						
No. 122	1	$3,847.00	$1,330.43		$230.81	$1,099.62
No. 126	1	2,885.00	1,326.90		173.10	1,153.80
No. 128	1	3,590.00	1,284.60	$225.00	215.40	1,294.20
No. 131	1	3,590.00	1,284.60		1,284.60	(1)
No. 133	1	3,650.00	1,456.38		219.00	1,237.38
No. 134	1	3,650.00	1,281.00		219.00	1,062.00
No. 135	1	3,650.00	1,281.00		1,281.00	(1)
No. 137	1	3,650.00	1,281.00	300.00	219.00	1,362.00
No. 212	1	3,800.00	1,272.00		228.00	1,044.00
No. 214	1	3,597.00	1,296.71		1,296.71	(1)
No. 216	1	3,597.00	1,284.18		215.82	1,068.36
No. 217	1	3,597.00	1,284.18		215.82	1,068.36
Barge, decked:						
No. 9309	1	3,170.00	3,454.07	3.15	190.20	3,267.02
No. 9315	1	3,170.00				(2)
No. 9318	1	3,170.00	2,715.70		190.20	2,525.50
No. 9319	1	3,170.00				(3)
No. 9325	1	2,466.67				(2)

[1] Sunk; will be dropped by affidavit. [2] Sunk; dropped by affidavit. [3] Worthless.

Name.	No.	Original cost.	Valuation last year.	Repairs.	Depreciation.	Present estimated value.
Barge, decked—Continued.						
No. 9327	1	$2,466.66	$2,183.38		$148.00	$2,035.38
No. 0801	1	5,727.53	2,945.59		286.38	2,659.21
No. 0802	1	5,727.53	2,854.49	$271.30	286.38	2,839.41
No. 0803	1	5,727.53	3,030.69		286.38	2,744.31
No. 0804	1	5,727.53	2,884.99		286.38	2,598.61
No. 0805	1	3,531.50	903.43		176.58	726.85
No. 0807	1	5,624.70	1,581.40		281.24	1,300.16
No. 0808	1	5,624.70	1,522.45		281.24	1,241.21
No. 0809	1	5,624.70	1,597.60		281.24	1,316.36
No. 0811	1	5,727.53	2,854.21		286.38	2,567.83
No. 0901	1	5,569.58	2,917.18		278.48	2,638.70
No. 0903	1	5,569.58	2,944.04	2.10	278.48	2,667.66
No. 1001	1	4,242.00	2,907.21	75.00	212.10	2,770.11
No. 1002	1	4,242.00	2,794.85	34.35	212.10	2,617.10
No. 1003	1	4,242.00	2,803.25		212.10	2,591.15
No. 1004	1	4,242.00	3,295.96	479.88	212.10	3,563.74
No. 1005	1	4,050.00	2,903.89	60.00	202.50	2,761.39
No. 1006	1	4,050.00	2,829.47		202.50	2,626.97
No. 1007	1	4,246.58	3,019.11		212.33	2,806.78
No. 1008	1	4,246.58	2,932.61	490.25	3,422.86	(1)
No. 1009	1	4,246.58	3,603.70		212.33	3,391.37
No. 1010	1	4,246.58	2,935.77		212.33	2,723.44
No. 1011	1	4,246.58	2,993.66		212.33	2,781.33
No. 1012	1	4,246.58	2,929.57		212.33	2,717.24
No. 1101	1	4,300.00	3,261.55	72.30	215.00	3,118.85
Barge, steel:						
No. 1201	1	8,900.00	7,568.37		356.00	7,212.37
No. 1202	1	8,900.00	6,937.13	76.42	356.00	6,657.55
No. 1203	1	8,900.00	7,016.34		356.00	6,660.34
No. 1204	1	8,900.00	6,975.99		356.00	6,619.99
No. 1206	1	8,900.00	7,006.63		356.00	6,650.63
No. 1207	1	8,900.00	6,978.73		356.00	6,622.73
No. 1209	1	8,900.00	6,953.74	81.75	356.00	6,679.49
No. 1210	1	8,900.00	7,076.12		356.00	6,720.12
No. 1212	1	8,900.00	6,765.62		356.00	6,409.62
No. 1213	1	8,900.00	6,765.62		356.00	6,409.62
No. 1214	1	8,900.00	7,045.62		356.00	6,689.62
Barge, decked:						
No. 1215	1	4,194.00	3,181.67		209.70	2,971.97
No. 1216	1	4,194.00	3,320.87		209.70	3,111.17
No. 1217	1	4,194.00	3,074.57	15.20	209.70	2,880.07
No. 1218	1	4,194.00	3,148.70		209.70	2,939.00
No. 1219	1	4,194.00	3,017.15	120.00	209.70	2,927.45
No. 1220	1	4,194.00	3,093.45	18.00	209.70	2,901.75
No. 1221	1	4,194.00	3,104.03		209.70	2,894.33
No. 1302	1	4,773.15	3,706.23	98.20	238.66	3,565.77
No. 1303	1	4,773.15	3,579.87		238.66	3,341.21
No. 1304	1	4,773.15	3,661.78	47.00	238.66	3,470.12
No. 1305	1	4,773.15	4,094.16		238.66	3,855.50
No. 1306	1	4,773.15	3,621.08	67.20	238.66	3,449.62
Barge, steel:						
No. 1307	1	8,500.00	6,931.17		340.00	6,591.17
No. 1308	1	8,500.00	6,918.36	65.62	340.00	6,643.98
No. 1309	1	8,500.00	6,909.00		340.00	6,569.00
No. 1310	1	8,500.00	7,018.35		340.00	6,678.35
No. 1314	1	8,500.00	6,909.00		340.00	6,569.00
No. 1315	1	8,500.00	6,909.00		340.00	6,569.00
No. 1316	1	8,500.00	7,033.71		340.00	6,693.71
No. 1317	1	8,500.00	6,909.00	395.40	340.00	6,964.40
No. 1318	1	8,500.00	6,909.00		340.00	6,569.00
Barge, decked:						
No. 1403	1	4,500.00	3,740.83		225.00	3,515.83
No. 1404	1	4,500.00	3,838.88		225.00	3,613.88
No. 1405	1	4,500.00	4,084.24		225.00	3,859.24
No. 1406	1	4,500.00	3,708.57	260.00	225.00	3,743.57
No. 1408	1	4,500.00	3,749.51		225.00	3,524.51
No. 1409	1	4,500.00	3,699.87	14.20	225.00	3,489.07
No. 1410	1	4,500.00	3,838.35		225.00	3,613.35
No. 1701	1	4,830.00	4,830.00		241.50	4,588.50
No. 1702	1	4,830.00	4,830.00		241.50	4,588.50
No. 1703	1	4,830.00	4,830.00		4,830.00	(1)
No. 1704	1	4,830.00	4,830.00		241.50	4,588.50
No. 1705	1	4,830.00	4,830.00		241.50	4,588.50
No. 1706	1	4,830.00	4,830.00		241.50	4,588.50
No. 1707	1	4,830.00	4,830.00		241.50	4,588.50
Barge, mattress:						
No. 5	1	4,530.00	2,790.14		226.50	2,563.64
No. 6	1	4,530.00	2,739.63		226.50	2,513.13
No. 9308	1	2,800.00	5,264.66		140.00	5,124.66

[1] Sunk; to be dropped by affidavit.

Name.	No.	Original cost.	Valuation last year.	Repairs.	Depreciation.	Present estimated value.
Barge, mattress—Continued.						
No. 9312	1	$2,800.00	$5,442.77	....	$140.00	$5,302.77
No. 0701	1	5,120.00	3,838.37	....	306.00	3,532.37
No. 0703	1	5,120.00	4,073.15	....	306.00	3,767.15
No. 1018	1	4,642.91	3,334.99	....	232.15	3,102.84
No. 1019	1	4,642.91	3,334.43	....	232.15	3,102.28
No. 1501	1	6,992.03	6,676.31	$135.00	349.60	6,461.71
No. 1502	1	6,992.02	6,614.17	105.25	349.60	6,369.82
Barge, mooring:						
No. 1	1	2,023.00	537.05	....	537.05	(1)
No. 2	1	2,023.00	491.04	....	121.38	369.66
No. 1222	1	3,560.00	2,463.97	....	178.00	2,285.97
No. 1223	1	3,780.00	2,599.71	325.50	189.00	2,736.21
No. 1224	1	3,560.00	2,503.65	....	178.00	2,325.65
No. 1225	1	3,780.00	2,642.11	....	189.00	2,453.11
Barge, flat:						
No. 4	1	400.00	293.67	....	23.03	270.64
No. 5	1	499.80	377.02	....	22.99	354.03
No 1311	1	743.04	569.66	....	37.15	532.51
No. 1312	1	743.04	575.47	....	37.15	538.32
No 1313	1	743.04	580.90	....	37.15	543.75
No. 1708	1	992.00	992.00	....	49.60	942.40
No 1709	1	992.00	992 00	....	49.60	942.40
Derrick boat:						
No. 3	1	2,956.00	5,253.63	375.50	147.80	5,481.33
No. 1017	1	5,959.40	4,263.52	164.00	297.97	4,129.55
No 1411	1	8,481.70	8,103.54	735.00	424.09	8,414.45
Quarter boat:						
No. 2	1	5,200.00	2,688.00	74.70	312.00	2,450.70
No. 3	1	5,200.00	2,688.00	45.40	312.00	2,421.40
No. 5	1	5,200.00	2,845.16	36.20	312.00	2,569.36
No. 6	1	5,200.00	2,713.50	75.20	312.00	2,476.70
No. 8	1	3,645.00	2,648.13	353.65	218.70	2,783.08
No 11	1	3,645.00	1,434.84	....	1,434.84	(2)
No 12	1	3,645.00	3,381.42	125.00	218.70	3,287.72
No 25	1	3,645.00	1,093.71	72.00	1,165.71	(3)
No. 26	1	3,645.00	3,397.56	179.20	218.70	3,358.06
No. 27	1	2,788.00	4,022.78	235.40	139.40	4,118.78
No. 29	1	2,741.00	1,268.65	....	164.46	1,104.19
No 220	1	4,900.00	3,475.31	238.50	3,713.81	(1)
No. 221	1	4,900.00	3,897.65	175.00	294.00	3,778.65
No. 0501	1	3,059.00	2,112.63	975.72	152.95	2,935.40
No 1020	1	9,889.11	6,206.67	163.45	494.46	5,875.66
No 1021	1	9,889.11	6,058.80	75.00	494.46	5,639.34
No. 1201	1	5,800.00	4,375.19	786.63	290.00	4,871.82
No. 1402	1	10,309.94	7,845.42	727.79	520.00	8,053.21
Hydraulic grader:						
No 2	1	30,232.00	(4)	(4)	(4)	(4)
No 1022	1	15,900.00	11,985.97	971.85	12,957.82	(1)
No 1205	1	31,721.07	30,383.44	2,486.62	1,268.84	31,601.22
No. 1401	1	32,802.63	28,988.58	1,275.48	1,224.14	29,039.92
Sand digger No. 1407	1	13,445.00	11,652.14	412.51	672 25	11,392.40
Concrete mixing plant No. 1208	1	25,000.00	37,960.88	1,958.11	1,315.60	38,603.39
Floating dock	1	9,475.00	591.53	192.05	568.50	215.08
Machine shop No. 1	1	8,501.00	9,571.19	625.64	510.06	9,686.77
Pile driver No. 4	1	4,500.00	1,534.34	18.40	270.00	1,282.74
Towboats:						
Minnetonka	1	40,000.00	24,217.34	1,875.99	26,093.33	(1)
Wynoka	1	45,672.00	20,964.08	4,562.29	1,926.88	23,599.49
Onica	1	25,900.00	27,910.69	875.29	1,554.00	27,231.98
Graham	1	9,500.00	20,988.03	763.25	21,751.28	(1)
Search	1	9,000.00	11,761.53	1,431.07	540.00	12,652.60
Sacca	1	9,500.00	9,527.39	567.38	380.00	9,714.77
Augustus J. Nolty	1	34,735.00	31,744.46	1,250.00	13,994.46	[5] 19,000.00
W. M. Rees	1	34,735.00	32,637.84	975.09	1,389.40	32,223.53
Maud Kilgore	1	(6)	....	475.00	475.00	....
Mercury	1	(7)	....	275.00	275.00	....
Saturn	1	(7)	....	125.00	125.00	....
Dipper dredge, Northern No. 2	1	55,000.00	55,000.00	1,720.00	1,650.00	55,070.00
Tenders:						
Iota	1	(1)	....	175.00	175.00	....
Kappa	1	(1)	....	225.00	225.00	....
Gamma	1	(1)	....	79.40	79.40	....
Zeta	1	(1)	....	33.20	33.20	....

[1] Sunk; dropped by affidavit.
[2] Unserviceable; to be dropped by affidavit.
[3] Worthless.
[4] Worthless; to be dropped by I. and I. report.
[5] Sunk and hull recovered with some of the machinery.
[6] Chartered.
[7] Borrowed.

Name.	No.	Original cost.	Valuation last year.	Repairs.	Depreciation.	Presen estimated value.
Launch Opelika	1	$5,000.00	$10,061.14	$1,825.00	$810.00	$11,07
Scows, dump:						
No. 1	1	5,000.00	5,000.00	275.34	250.00	5,025.
No. 2	1	5,000.00	5,000.00	275.34	250.00	5,025.
Boiler shop No. 0806	1	3,531.51	973.07	175.00	211.89	936.
Skiffs	25	910.00	680.73	75.00	43.50	712.
Calking flat No. 1	1	20.00	77.20	75.00	1.20	151.
Boats:						
Metallic	3	180.00	142.80		7.20	135.
Life	2	170.00	134.87		6.80	128.
Creosote tanks	2	1,347.37	880.82	325.28	53.89	1,152.
Locomotive crane	1	7,125.00	6,193.23	875.50	1,187.50	5,881.
Concrete revetment plant (dismantled)	1	12,163.00	163.00			163.
Tools and appliances		46,668.43	31,898.75	1,275.95	4,666.84	28,507.
Repair material on hand				1,855.18		1,855.
Total		1,174,271.03	897,999.13	39,832.62	145,518.56	792,313.

Care of plant.—All the plant employed in these districts was suitably care for during the year at Memphis, Tenn., at a total expense of $38,330.

Recapitulation.

New plant	$181,099.9
Repairs to plant	39,832.6
Care of plant	38,330.0
Total	259,262.5

Contracts in force.

Name of contractor.	Amount and character of work.	Price per unit.	Date of approval.	Date of beginning work.	Date of expiration.
G. W. Fisher[1]	Rent of river front at Government fleet.	[2] $50.00	June 15, 1917	July 1, 1917	June 30, 191
Chas. H. Boyle[1]	....do	50.00	....do	....do	Do.
Mrs. Jennie Astor and husband, W. B. Astor.[1]	Rent of land near Government fleet.	100.00	....do	....do	Do.
St. Louis-San Francisco Ry. Co.[1]	....do	125.00	June 18, 1917	....do	Do.
Memphis Steel Construction Co. of Pennsylvania.[3]	Constructing and delivering one steel barge.	23,400.00	Jan. 21, 1918	Feb. 14, 1918	Do.

[1] Lease.
[2] Per annum.
[3] Contract: Percentage of completion, 3.

INCLOSURES.

The following inclosures accompany this report, of which they are parts:

Plate No. 1. First and second districts, index map.

Plate No. 2. Columbus, Ky.

Plate No. 3. Hickman, Ky., and bend of Island No. 8, Mo.

Plate No. 4. Slough Landing Neck, New Madrid, Mo., and Point Pleasa Reach.

Plate No. 5. Gayoso Bend and Caruthersville, Mo.

Plate No. 6. Barfield, Ark.

Plate No. 7. Plum Point Reach, chute of Island No. 26, Daniels Point, As port Bend, Gold Dust, Tenn., Fletchers Bend, Osceola Front, Ark., and Bulle ton Bar, Ark.

Plate No. 8. Golden Lake, Ark.

Plate No. 9. Memphis Reach, Hopefield Point, Memphis Harbor, Tenness Chute.

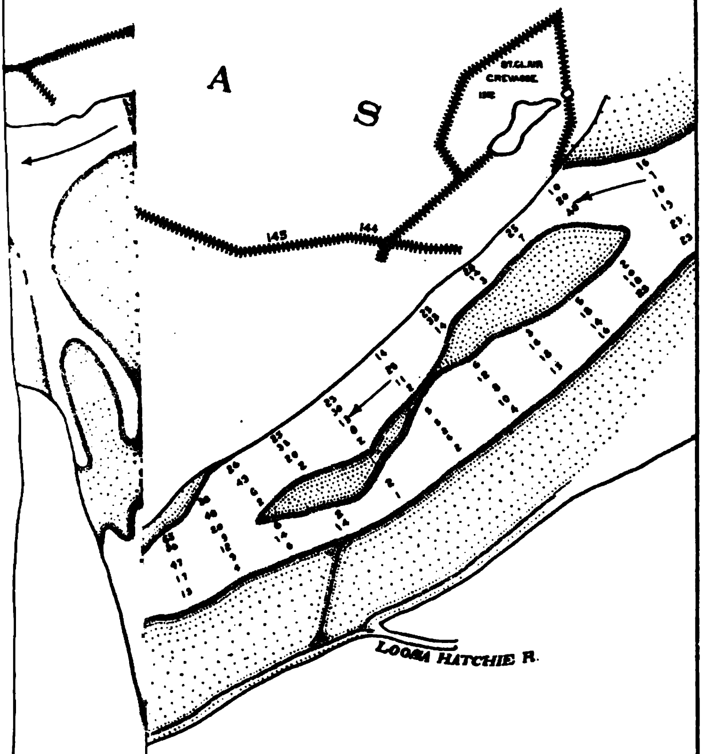
Plate No. 10. Norfolk and Star Landing, Miss., and Porter Lake, Ark.

Plate No. 11. Walnut Bend, Ark.

WAR DEPAR

MISSISSIPPI RIVER COMMISSION

PLATE NO. 9



T

MISSISSIPPI RIVER
MEMPHIS REACH
SURVEY OF APRIL 1918

IN ONE SHEET SHEET NO. 1

SCALE OF FEET

DISTRICTS MISSISSIPPI RIVER COMMISSION OFFICE
MEMPHIS, TENN. JUNE 1918

SUBMITTED BY APPROVED

Dubrock Montgomery Gardner,

NGR. JR. ENGR. ASST. ENGR. IN CHARGE

FILE No. $\frac{14}{27}$

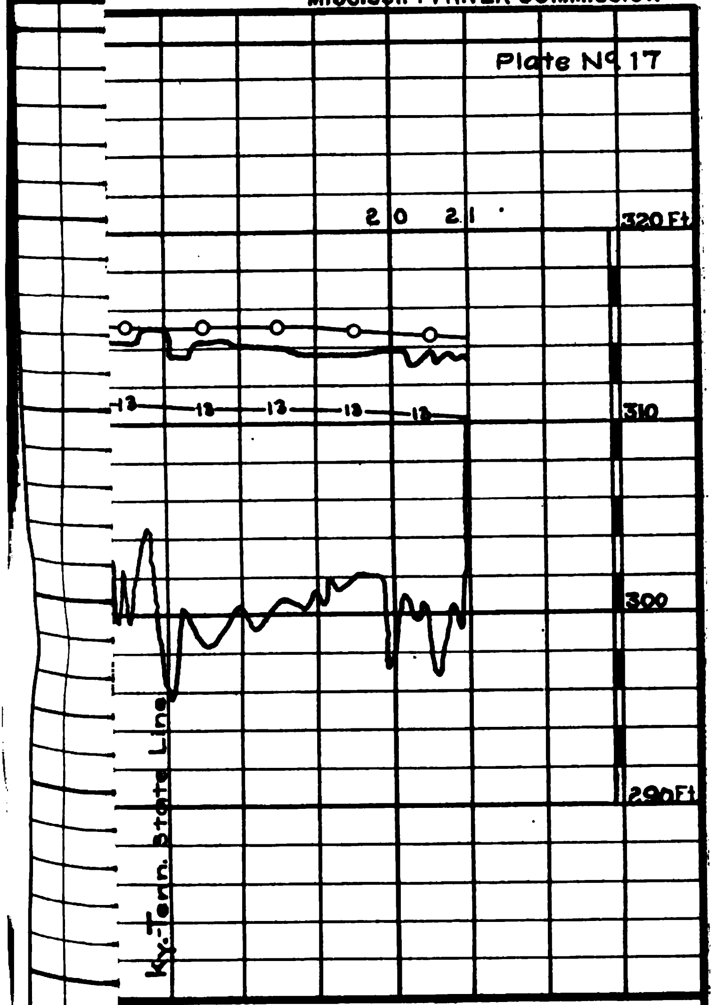
TO ACCOMPANY
ANNUAL REPORT 1917-18.

LEGEND
SHORE LI
SHORE LIN
REVETMENT
SOUNDINGS

81116

WAR DEP

MISSISSIPPI RIVER COMMISSION



MISSISSIPPI RIVER
REELFOOT LEVEE DISTRICT

IN ONE SHEET SHEET NO. 1

SCALE OF FEET

HOR. 0 5000 10000 VERT. 0 1 2 3 4 5

DISTRICTS MISSISSIPPI RIVER COMMISSION OFFICE
MEMPHIS, TENN. MAY 1918

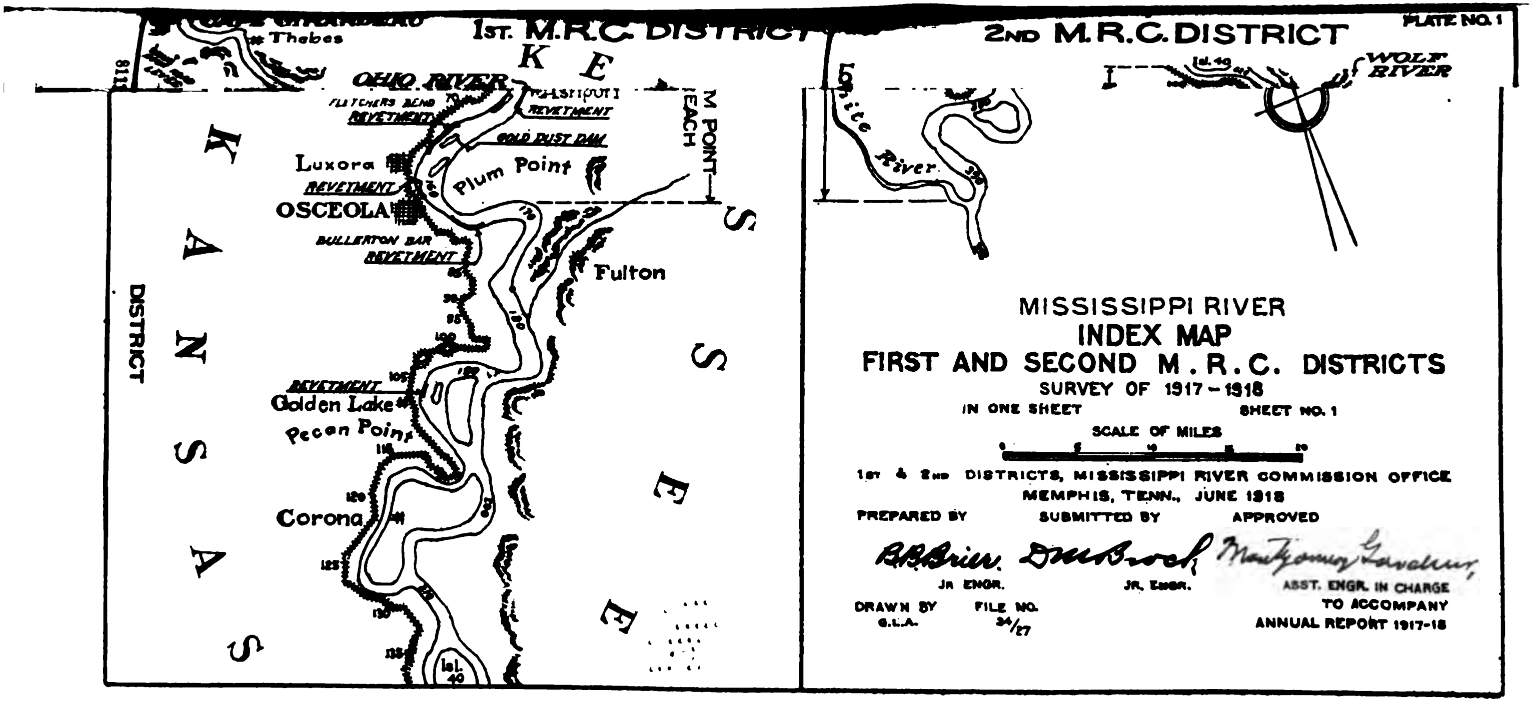
Y SUBMITTED BY APPROVED

ENGR. ASST. ENGR. ASST. ENGR. IN CHARGE

FILE NO.
34/27

TO ACCOMPANY
ANNUAL REPORT 1917 18

8111



MISSISSIPPI RIVER
INDEX MAP
FIRST AND SECOND M.R.C. DISTRICTS
SURVEY OF 1917–1918
IN ONE SHEET SHEET NO. 1

SCALE OF MILES
0 5 10 15 20

1ST & 2ND DISTRICTS, MISSISSIPPI RIVER COMMISSION OFFICE
MEMPHIS, TENN., JUNE 1918

PREPARED BY
B.B.Brier
JR ENGR.

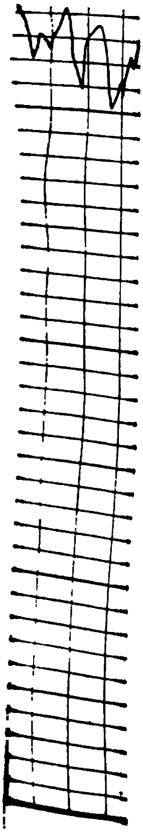
SUBMITTED BY
D.M.Brock
JR. ENGR.

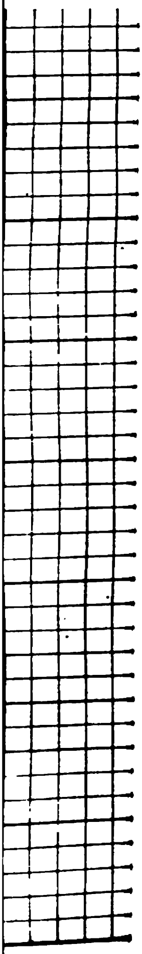
APPROVED
Montgomery Gavalier
ASST. ENGR. IN CHARGE

DRAWN BY
G.L.A.

FILE NO.
34/27

TO ACCOMPANY
ANNUAL REPORT 1917-18





[illegible]

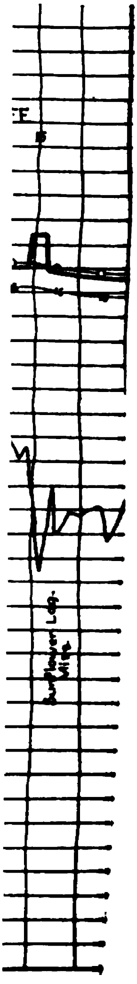

F
Sunflower Lep.

Plate No. 12. Helena Reach, Trotters Revetment, Helena Revetment.
Plate No. 13. Delta, Miss.
Plate No. 14. Old Town, Ark.
Plate No. 15. Sunflower, Miss.
Plate No. 16. Upper St. Francis levee district.
Plate No. 17. Reelfoot levee district.
Plate No. 18. Lower St. Francis levee district.
Plate No. 19. White River levee district.
Plate No. 20. Upper Yazoo levee district.

Money statements and abstract of contracts in force follow.

MONTGOMERY GARDNER,
Assistant Engineer in Charge.

Abstract of contracts in force June 30, 1918.

Names of contractors.	Amount and character of work.	Rate per cubic yard.	Date of approval.	Date of beginning work.	Date of expiration of contract.	Percentage completed June 30, 1918.
Upper St. Francis levee district.		*Cents.*				
R. L. Leonard	122,349 cubic yards levee work, stations 20/16–22/0	21.00	Oct. 25, 1916	Nov. 9, 1916	Dec. 31, 1917	[1] [2] 99.0
Do	187,935 cubic yards levee work, stations 24/0–26/15	21.00	do	do	do	[1] 71.0
Walter L. Lee	75,000 cubic yards levee work, stations 30/0–31/0	33.00	Oct. 11, 1917	Oct. 29, 1917	Dec. 31, 1918	00.0
Do	50,000 cubic yards levee work, stations 33/0–34/0	33.00	do	do	do	00.0
Do	145,000 cubic yards levee work, stations 35/28–37/40	28.00	do	do	do	26.0
Walter Lee	71,046 cubic yards levee work, stations 42/6–43/10	35.00	Nov. 15, 1917	Nov. 21, 1917	do	30.0
Roach, Stansell, Lowrance Bros. & Co.	930,000 cubic yards levee work, stations 67/57–72/12	24.80	Dec. 8, 1917	Dec. 28, 1917	Dec. 31, 1919	45.0
Lower St. Francis levee district.						
Roach, Stansell, Lowrance Bros. & Co.	300,000 cubic yards levee work, stations 41/0–48/4	25.00	Oct. 9, 1917	Oct. 25, 1917	Dec. 31, 1918	[2] 60.0
Do	250,000 cubic yards levee work, stations 83/30–87/14	30.00	do	do	do	00.0
Do	180,000 cubic yards levee work, stations 93/15–96/8	25.00	do	do	do	[2] 63.9
Do	798,408 cubic yards levee work, stations 130/0–140/29	29.50	do	do	do	[2] 31.8
Do	227,896 cubic yards levee work, stations 146/15–147/8	17.50	July 14, 1915	July 24, 1915	Dec. 31, 1916	[1] [2] 48.5
R. L. Leonard	277,000 cubic yards levee work, stations 157/19–160/0	26.00	Oct. 9, 1916	Oct. 24, 1916	Dec. 31, 1917	[1] 66.8
Roach, Stansell, Lowrance Bros. & Co.	128,000 cubic yards levee work, stations 168/20–169/30	45.00	Oct. 9, 1917	Oct. 25, 1917	Dec. 31, 1918	[2] 68.0
H. B. Banks	152,000 cubic yards levee work, stations 171/32–173/0	28.00	Oct. 6, 1917	do	do	45.3
Do	490,000 cubic yards levee work, stations 173/0–179/0	22.00	Oct. 8, 1917	do	do	[2] 14.0
Do	103,700 cubic yards levee work, stations 179/0–180/0	30.00	Oct. 6, 1917	do	do	[2] 35.0
White River levee district.						
Rodgers Bros	160,000 cubic yards levee work, stations 36/0–37/0	29.70	Oct. 21, 1916	Nov. 8, 1916	Dec. 31, 1917	[1] [2] 40.7
R. T. Clark & Co	279,315 cubic yards levee work, stations 52/48–53/30	40.00	Emergency	Oct. 1, 1917	Dec. 31, 1918	[3] 100.0
Leases and contract for constructing steel barge.						
G. W. Fisher	Rent of river front at Memphis, Tenn	[4] $50.00	Lease	July 1, 1917	June 30, 1918	
Chas. H. Boyle	do	50.00	do	do	do	
Mrs. Jennie Astor and husband, W. B. Astor.	Rent of land near Government fleet	100.00	do	do	do	
St. Louis-San Francisco Ry. Co.	do	125.00	do	do	do	
Memphis Steel Construction Co. of Pennsylvania.	Constructing and delivering one steel barge	23,400.00	Jan. 21, 1918	Feb. 14, 1918	do	[1] 10.0

---

[1] Time limit waived.

[2] Work temporarily suspended.

[3] Completed.

[4] Per annum.

FINANCIAL STATEMENT, MISSISSIPPI RIVER COMMISSION, FIRST AND SECOND DISTRICTS.

Appropriation for Mississippi River.

UPPER ST. FRANCIS LEVEE DISTRICT.

July 1, 1917, balance unexpended	$100,000.00
June 30, 1918, amount expended during fiscal year	79,957.41
July 1, 1918, balance unexpended	20,042.59
July 1, 1918, amount covered by uncompleted contracts	20,042.59

LOWER ST. FRANCIS LEVEE DISTRICT.

July 1, 1917, balance unexpended	[1] 234,915.62
July 11, 1917, amount received from sale of United States property (contact prints)	.70
Nov. 12, 1917, amount received by transfer from "Bullerton Bar, Ark."	40,000.00
	274,916.32
June 30, 1918, amount expended during fiscal year	274,916.32

WHITE RIVER LEVEE DISTRICT.

July 1, 1917, balance unexpended	100,000.00
June 30, 1918, amount expended during fiscal year	100,000.00

REELFOOT LEVEE DISTRICT.

July 1, 1917, balance unexpended	[2] 32,018.34
June 30, 1918, amount expended during fiscal year	32,018.34

GAYOSO BEND, MO.

July 1, 1917, balance unexpended	[3] 98,491.44
June 30, 1918, amount expended during fiscal year	98,491.44

OSCEOLA, ARK.

Feb. 11, 1918, amount received by transfer from Helena, Ark	25,000.00
July 1, 1918. balance unexpended and available	25,000.00

BARFIELD, ARK.

July 1, 1917, balance unexpended	[4] 50,270.97
June 30, 1918, amount expended during fiscal year	50,270.97

BULLERTON BAR, ARK.

July 1, 1917, balance unexpended		84,757.82
Less amounts transferred, as follows:		
Nov. 12, 1917, to Norfolk, Miss	$40,000.00	
Nov. 12 1917, to lower St. Francis levee district	40,000.00	
		80.000.00
		4.757.82
June 30, 1918, amount expended during fiscal year		4,757.82

---

[1] Balance reported as unexpended at end of fiscal year 1917, viz, $234,632.52, increased $283.10 by reimbursement received from appropriation "Pay, etc., of the Army, 1917." covering part pay of Engineer officer, paid in June, 1917, chargeable to appropriation named above.

[2] Balance reported as unexpended at end of fiscal year 1917, viz, $31,970.34, increased $48 account refundment resulting from cancellation of check for $48 issued previous to fiscal year 1918.

[3] Amount reported as unexpended at end of fiscal year 1917, viz, $98,221.44, increased $270, account reimbursement from appropriation for "Removing obstructions in Mississippi and Atchafalaya Rivers, 1917," covering value of coal paid for and transferred to St. Louis, Mo., Engineer district in fiscal year 1917.

[4] Amount formerly reported as unexpended at end of fiscal year 1917, viz, $50,269.97, increased $1 on account of refundment of overpayment on voucher in fiscal year 1917.

MEMPHIS HARBOR.

July 1, 1917, balance unexpended	$4, 892. 23
June 30, 1918, amount expended during fiscal year	4, 892. 23

NORFOLK, MISS.

Nov. 12, 1917, amount received by transfer from Bullerton, Bar, Ark	40, 000. 00
June 30, 1918, amount expended during fiscal year	18, 792. 53
July 1, 1918, balance unexpended	21, 207. 47
July 1, 1918, outstanding liabilities	13, 500. 00
July 1, 1918, balance available	7, 707. 47

PORTER LAKE, ARK.

July 1, 1917, balance unexpended	70, 546. 34
June 30, 1918, amount expended during fiscal year	70, 546. 34

HELENA, ARK.

July 1, 1917, balance unexpended	30, 170. 42
Feb. 11, 1918, less amount transferred to Osceola, Ark	25, 000. 00
	5, 170. 42
June 30, 1918, amount expended during fiscal year	649. 77
July 1, 1918, balance unexpended and available	4, 520. 65

OLD TOWN BEND, ARK.

July 1, 1917, balance unexpended	26, 822. 32
June 30, 1918, amount expended during fiscal year	26, 822. 32

GENERAL REPAIRS AND STONE.

July 1, 1917, balance unexpended	45, 971. 50
June 30, 1918, amount expended during fiscal year	45, 971. 50

PLANT.

July 1, 1917, balance unexpended	26, 344. 19
Mar. 11, 1918, amount received from sale of United States property	300. 00
June 14, 1918, amount received from rent of plant	1, 144. 66
	27, 788. 85
June 30, 1918, amount expended during fiscal year	26, 644. 19
July 1, 1918, balance unexpended and available	1, 144. 66

NEW PLANT.

July 1, 1917, balance unexpended		181, 791. 91
June 30, 1918, amount expended during fiscal year		133, 954. 39
July 1, 1918, balance unexpended		47, 837. 52
July 1, 1918, outstanding liabilities	$45, 000. 00	
July 1, 1918, amount covered by uncompleted contracts	2, 837. 52	
		47, 837. 52

Appropriation for maintenance and improvement of existing river and harbor works, act of Oct. 2, 1914.

UPPER ST. FRANCIS LEVEE DISTRICT.

May 8, 1918, amounts received by transfer from allotments under office, secretary, Mississippi River Commissioner, as follows:	
Mississippi River Commission	$8.82
Surveys, gauges, and observations	63.84
Dredges and dredging	1,564.62
	1,637.28
July 1, 1918, balance unexpended and available	1,637.28

WATSON POINT DIKE AT SLOUGH LANDING NECK.

July 1, 1917, balance unexpended	442.94
June 30, 1918, amount expended during fiscal year	442.94

Appropriation for maintenance and improvement of existing river and harbor works, act of Mar. 4, 1914.

UPPER ST. FRANCIS LEVEE DISTRICT.

July 1, 1917, balance unexpended		[1]$24,188.91
May 8, 1918, received by transfers from allotments as follows:		
Office, secretary, Mississippi River Commission—		
Mississippi River Commission	$239.89	
Surveys, gauges, and observations	16,839.26	
Dredges and dredging	92,773.32	
Mississippi River Commission, first and second districts—		
Slough Landing Neck	8,264.56	
Delta, Miss	10,194.13	
Experimental revetment	2,798.61	
Mississippi River Commission, fourth district—		
Surveys	3,205.09	
Atchafalaya levee district	2,372.08	
Hard Times Bend	5,000.01	
Plaquemine	1,614.82	
General repairs and stone	4,574.18	
Harbor at New Orleans	20,335.09	
Atchafalaya and Red Rivers	167.15	
		168,378.19
		192,567.10
June 30, 1918, amount expended during fiscal year		24,188.91
July 1, 1918, balance unexpended		168,378.19
July 1, 1918, outstanding liabilities		148,000.00
July 1, 1918, balance available		20,378.19

LOWER ST. FRANCIS LEVEE DISTRICT.

July 1, 1917, balance unexpended	[2]0.96
June 30, 1918, amount expended during fiscal year	.96

---

[1] Amount reported as unexpended at end of fiscal year 1917, viz, $23,010.51, increased $1,178.40 for reasons following:

Reimbursement received from appropriation, "Pay, &c., of the Army, 1917," covering amount paid Engineer officer (for part pay, May, 1917), chargeable to appropriation named	$183.06
Reimbursement received from Little River drainage district, incurred for account of district named, and paid in fiscal year 1917	995.34
	1,178.40

[2] No balance was reported as unexpended at the end of fiscal year 1917, but due to refundment received on account of overpayment amounting to 96 cents on voucher in accounts for fiscal year 1917, it becomes necessary to report a "balance unexpended," as stated above.

WHITE RIVER LEVEE DISTRICT.

July 1, 1917, balance unexpended	$23,242.21
July 12, 1917, amount received from sale of United States property	102.55
	23,344.76
June 30, 1918, amount expended during fiscal year	23,344.76

SLOUGH LANDING NECK.

July 1, 1917, balance unexpended	8,758.25
May 8, 1918, less amount transferred to Upper St. Francis levee district	8,264.56
	493.69
June 30, 1918, amount expended during fiscal year	493.69

MEMPHIS HARBOR.

July 1, 1917, balance unexpended	25,000.00
June 30, 1918, amount expended during fiscal year	25.000.00

DELTA, MISS.

July 1, 1917, balance unexpended	10,409.88
May 8, 1918, less amount transferred to Upper St. Francis levee district	10,194.13
	215.75
June 30, 1918, amount expended during fiscal year	215.75

GENERAL REPAIRS AND STONE.

July 1, 1917, balance unexpended	[1] 15.00
June 30, 1918, amount expended during fiscal year	15.00

EXPERIMENTAL REVETMENT.

July 1, 1917, balance unexpended	2,829.27
May 8, 1918, less amount transferred to upper St. Francis levee district	2,798.61
	30.66
June 30, 1918, amount expended during fiscal year	30.66

NEW PLANT.

July 1, 1917, balance unexpended	15,000.00
June 30, 1918, amount expended during fiscal year	15,000.00

Appropriation for flood-control, Mississippi River, and Sacramento River, Cal.

SURVEYS.

Aug. 10, 1917, amount allotted from sundry civil act of June 12, 1917	$5,000.00
June 30, 1918, amount expended during fiscal year	5,000.00

UPPER ST. FRANCIS LEVEE DISTRICT.

Aug. 10, 1917, amount allotted from sundry civil act of June 12, 1917		90,000.00
July 1, 1918, balance unexpended		90,000.00
July 1, 1918, outstanding liabilities	$500.00	
July 1, 1918, amount covered by uncompleted contracts	78,000.00	78,500.00
July 1, 1918, balance available		11,500.00

---

[1] No balance was reported as unexpended at the end of fiscal year 1917, but due to reimbursement from appropriation act "To provide compensation for employees suffering injuries, etc." (approved Sept. 7, 1916), for amounts paid in fiscal year 1917 for account of above named appropriation, it becomes necessary to report a "balance unexpended," as stated above.

LOWER ST. FRANCIS LEVEE DISTRICT.

Aug. 10, 1917, amount allotted from sundry civil act of June 12, 1917		$450,000.00
June 30, 1918, amount expended during fiscal year		156,365.90
July 1, 1918. balance unexpended		293,634.10
July 1, 1918, outstanding liabilities	$2,000.00	
July 1, 1918, amount covered by uncompleted contracts	290,000.00	292,000.00
July 1, 1918, balance available		1,634.10

WHITE RIVER LEVEE DISTRICT.

Aug. 10, 1917, amount allotted from sundry civil act of June 12, 1917		110,000.00
June 30, 1918, amount expended during fiscal year		86,489.31
July 1, 1918, balance unexpended		23,510.69
July 1, 1918, outstanding liabilities	$500.00	
July 1, 1918, amount covered by uncompleted contracts	7,000.00	7,500.00
July 1, 1918, balance available		16,010.69

REELFOOT LEVEE DISTRICT.

Aug. 10, 1917, amount allotted from sundry civil act, June 12, 1917	10,000.00
June 30, 1918, amount expended during fiscal year	10,000.00

GAYOSO BEND, MO.

Aug. 10, 1917, amount allotted from sundry civil act, June 12, 1917	80,000.00
Nov. 12, 1917, less amount transferred to Osceola, Ark.	30,000.00
	50,000.00
June 30, 1918, amount expended during fiscal year	36,522.53
July 1, 1918, balance unexpended	13,477.47
July 1, 1918, outstanding liabilities	4,200.00
July 1, 1918, balance available.	9,277.47

BARFIELD, ARK.

Aug. 10, 1917, amount allotted from sundry civil act, June 12, 1917	100,000.00
June 30, 1918, amount expended during fiscal year	79,270.05
July 1, 1918, balance unexpended	20,729.95
July 1, 1918, outstanding liabilities	1,000.00
July 1, 1918, balance available	19,729.95

STAR LANDING, MISS.

Aug. 10, 1917, amount allotted from sundry civil act, June 12, 1917	120,000.00
Nov. 30, 1917, amount transferred to Lower Yazoo levee district (third Mississippi River Commission district allotment)	120,000.00

PORTER LAKE, ARK.

Aug. 10, 1917, amount allotted from sundry civil act, June 12, 1917	130,000.00
June 30, 1918, amount expended during fiscal year	105,329.69
July 1, 1918, balance unexpended	24,670.31
July 1, 1918, outstanding liabilities	7,000.00
July 1, 1918, balance available	17,670.31

OLD TOWN BEND, ARK.

Aug. 10, 1917, amount allotted from sundry civil act, June 12, 1917	$40,000.00
June 30, 1918, amount expended during fiscal year	40,000.00

GENERAL REPAIRS AND STONE.

Aug. 10, 1917, amount allotted from sundry civil act, June 12, 1917	50,000.00
Nov. 12, 1917, less amount transferred to Osceola, Ark.	15,000.00
	35,000.00
June 30, 1918, amount expended during fiscal year	35,000.00

PLANT.

Aug. 10, 1917, amount allotted from sundry civil act, June 12, 1917		75,000.00
Amount received from rent of plant, as follows:		
April 6, 1918	$505.30	
May 7, 1918	489.30	
May 15, 1918	146.79	
June 11, 1918	1,485.00	
		2,626.39
		77,626.39
June 30, 1918, amount expended during fiscal year		76,116.14
July 1, 1918, balance unexpended		1,510.25
July 1, 1918, outstanding liabilities		1,510.25

NEW PLANT.

Aug. 10, 1917, amount allotted from sundry civil act, June 12, 1917	128,000.00
July 1, 1918, balance unexpended	128,000.00
July 1, 1918, amount covered by uncompleted contracts	20,600.00
July 1, 1918, balance available	107,400.00

MEMPHIS HARBOR.

Aug. 10, 1917, amount allotted from sundry civil act, June 12, 1917	250,000.00
June 30, 1918, amount expended during fiscal year	183,973.32
July 1, 1918, balance unexpended	66,026.68
July 1, 1918, outstanding liabilities	28,000.00
July 1, 1918, balance available	38,026.68

OSCEOLA, ARK.

Nov. 12, 1917, amounts received by transfer from—	
Gayoso Bend, Mo	30,000.00
General repairs and stone	15,000.00
	45,000.00
June 30, 1918, amount expended during fiscal year	31,541.01
July 1, 1918, balance unexpended and available	13,458.99

Appropriation for increase of compensation, act of June 12, 1917.

Amount received from act above cited for expenditure during fiscal year 1918	$8,000.00
June 30, 1918, amount expended during fiscal year	7,551.58
July 1, 1918, balance unexpended (available)	448.42

Funds contributed for improvement of Mississippi River in upper St. Francis levee district.

SPECIAL FUNDS (CONTRIBUTED FOR EXPENDITURE BY THE ST. JOHN LEVEE AND DRAINAGE DISTRICT, NEW MADRID, MO., AND MISSISSIPPI COUNTY LEVEE DISTRICT NO. 1, CHARLESTON, MO.

July 1, 1917, balance unexpended	$207,265.31
June 30, 1918, amount expended during fiscal year	78,919.31
July 1, 1918, balance unexpended	128,346.00
July 1, 1918, amount covered by uncompleted contracts	128,346.00

Funds contributed for improvement of Mississippi River at Norfolk, Miss.

SPECAL FUND.

Amounts contributed for expenditure by the Yazoo-Mississippi Delta levee district, Clarksdale, Miss., as follows:

Oct. 25, 1917	$25,000.00	
Nov. 26, 1917	25,000.00	
		$50,000.00
June 30, 1918, amount expended during fiscal year		50,000.00

Special funds contributed for flood-control, Mississippi River (levee construction), under provisions of flood-control act approved Mar. 1, 1917.

REELFOOT LEVEE DISTRICT.

Aug. 16, 1917, amount contributed for expenditure by the Fulton County levee district, Hickman, Ky	$5,000.00
June 30, 1918, amount expended during fiscal year	5,000.00

UPPER ST. FRANCIS LEVEE DISTRICT.

Sept. 27, 1917, amount contributed for expenditure by the Mississippi County levee district No. 1, Charleston, Mo	$45,000.00
July 1, 1918, balance unexpended	45,000.00
July 1, 1918, amount covered by uncompleted contracts	45,000.00

LOWER ST. FRANCIS LEVEE DISTRICT.

Aug. 28, 1917, amount contributed for expenditure by the St. Francis levee district, Bridge Junction, Ark	$225,500.00
Sept. 6, 1917, amount contributed for expenditure by the St. Francis levee district of Missouri, Caruthersville, Mo	22,000.00
	247,500.00
July 1, 1918, balance unexpended	247,500.00
July 1, 1918, amount covered by uncompleted contracts	247.500.00

WHITE RIVER LEVEE DISTRICT.

Amounts contributed for expenditure by the Laconia levee district No. 1, Henrico, Ark., viz:

Oct. 18, 1917	$54,626.66	
Nov. 22, 1917	373.34	
		$55,000.00
June 30, 1918, amount expended during fiscal year		30,200.36
July 1, 1918, balance unexpended		24,799.64
July 1, 1918, amount covered by uncompleted contracts		24,799.64

APPENDIX 3.

IMPROVING MISSISSIPPI RIVER, THIRD DISTRICT.

This district extends from White River, Ark., to Warrenton, Miss., a distance of 214 miles by river.

District headquarters: Vicksburg, Miss.

District engineer: Maj. J. R. Slattery, Corps of Engineers, United States Army, to August 27, 1917; Lieut. Col. G. P. Howell, Corps of Engineers, United States Army, August 27 to September 24, 1917; A. M. Todd, assistant engineer in charge since September 25, 1917.

WORKS.

I. Revetments:
  (*a*) Lake Bolivar Front, Miss.
  (*b*) Ashbrook Neck, Miss.
  (*c*) Panther Forest, Ark.
  (*d*) Leland Neck, Ark.
  (*e*) Greenville, Miss.
  (*f*) Vaucluse, Ark.
  (*g*) Longwood, Miss.
  (*h*) Grand Lake, Ark.
  (*i*) Princeton, Miss.
  (*j*) Lake Providence, La.
  (*k*) Fitlers Bend, Miss.
  (*l*) Cottonwood, Miss.
I. Revetments—Continued.
  (*m*) Albemarle Bend, Miss.
  (*n*) Delta Point, La.
  (*o*) Vicksburg Harbor, Miss.
  (*p*) Reid-Bedford Bend, La.
  (*q*) Red Fork, Ark.
II. Levees:
  (*a*) Upper Tensas levee district.
  (*b*) Lower Yazoo levee district.
III. Surveys:
  (*a*) Revetment.
  (*b*) Reach and bank line.
IV. Plant.

I. REVETMENTS.

(*a*) *Lake Bolivar Front, Miss.*

Location and description.—Four hundred and seventeen miles below Cairo, left bank. Bank revetment.

Original condition.—Caving appears to have become active at this point about 1887, and by the latter part of 1888 it became evident that, unless the bank was revetted, the levee across the head of Lake Bolivar would be destroyed. The destruction of this levee would have necessitated building a long and expensive loop back of the lake.

Previous projects.—None.

Existing project.—The present project was adopted by the river and harbor act approved August 11, 1888, and provides for a revetment to correct, permanently locate, and deepen the channel of the river and to protect its bank against caving, and thus save a levee, situated between the head of Lake Bolivar and the river, the destruction of which would have resulted in the abandonment of a large area of valuable land, and would have necessitated the construction of a long and expensive loop back of Lake Bolivar.

Operations and results during the present year.—None.

Condition at end of year.—Effective length of the revetment is 8,640 feet; all in good condition except at some points along the upper bank where willow mats have been used above low water. These places should be repaved with stone. Caving below the revetment continues active, and an extension downstream of about 3.000 feet will be required to protect the controlling levee line.

The cost of this work to end of present year for new work amounts to $296,222 and for maintenance $184,688.18, a total of $480.910.18.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The bank along this front has been held, the levee has been saved, a large area of land has been protected, and the channel has been permanently located.

Proposed operations.—It is proposed to make the necessary repairs to maintain the work in good condition. and to extend downstream 8,000 feet.

Recommended modifications of project.—None.

Reference to published articles not previously reported.—None.

(b) *Ashbrook Neck, Miss.*

Location and description.—Four hundred and forty-six miles below Cairo, left bank. Bank revetment and spur dike.

Original condition.—In 1870 the width of this point at the narrowest place was approximately 4,300 feet. By 1890, caving along the upper side of the point had reduced the width of the neck to 2,300 feet. As there was no reason to expect the caving to stop from natural causes, a cut-off across this neck seemed imminent, unless steps were taken to prevent it. A cut-off would have upset the regimen of the river in this locality, and would have resulted in the loss of many miles of levee, the destruction of a large area of cultivated land, and bad channel conditions before the river could again adjust its slope.

Previous projects.—None.

Existing project.—While the original project, adopted in 1890, provided for the prevention of a cut-off by the construction of a series of spur dikes on the upper side of the neck to check erosion, and the retardation of the flow across the neck by slashings, it was modified during construction to provide continuous revetment in lieu of spur dikes, and a levee about 7,000 feet long in lieu of the slashings. The project was further modified in 1915, requiring the construction of an earthen dike, or levee to commission grade, about 26,000 feet long, extending from the main levee line to or near the high ground at the west end of Ashbrook Point.

Operations and results during the present year—Revetment.—Repairs were made to the existing revetment, requiring 637 squares of subaqueous willow mats and 805 squares of upper bank paved with stone at a cost of $17,402.38, charged to maintenance.

The revetment was extended downstream 1,100 feet, work on which was commenced September 17 and completed November 30. The type of work used was concrete upper bank paving and the reinforced type of concrete subaqueous mats, of which there were 3,076 squares sunk in place, 1,582 squares of upper bank paved with concrete, and 324 squares of brush and stone revetment placed. The total cost of new work amounted to $49,867.05. Details of costs and expenditures are given in the tables following; and location of work is shown in accompanying plate No. 3.

ASHBROOK NECK REVETMENT (446 L.), THIRD DISTRICT.

Reinforced concrete mattresses, total area 9,367 squares.[1]

BUILDING CONCRETE MATS.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [2]		$2,540.82		$0.271
Reinforcing wire fabric [3] ....squares..	9,368	10,679.52	1.00	1.140
Kraftpaper [3] ....pounds..	9,637	802.30	1.02	.086
Rope, manila [3] ....do....	3,856	1,156.74	.41	.123
Cement [3] ....sacks..	27,881	13,661.69	3.00	1.459
Sand and gravel [3] ....cubic yards..	9,496	7,216.96	1.01	.769
Coal [4] ....tons..	160	792.00	.02	.085
Oil [4]		50.00		.005
Miscellaneous expenses [5]		750.00		.080

[1] Mattresses manufactured at Greenville, Miss., output used at following localities:

	Squares.
Ashbrook Neck	3,076
Princeton	3,129
Vicksburg Harbor	3,162

[2] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[3] The reported cost of the material is the cost delivered on the job.

[4] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[5] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

Reinforced concrete mattresses, total area 9,367 squares—Continued.

BUILDING CONCRETE MATS—Continued.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Subsistence [1]		$7,234.52		$0.772
Steamboat expenses [2]		6,376.72		.681
Labor [3]		6,177.66		.659
Supervision [4]		2,413.95		.258
Total		59,952.88		
Used at Ashbrook Neck 3,076 squares—New work:				
Reinforced concrete mats ... squares	3,076	19,686.40		6.40
Willow connecting mats ... do	324	3,232.10		9.97
Total		22,918.50		

SINKING CONCRETE MATS.

	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [5]		$1,062.02		$0.345
½-inch strand [6] ... pounds	39,551	2,867.45	13.0	.932
½-inch clips [6] ... do	13,703	931.80	4.6	.303
Rope, manila [6] ... do	3,856	1,156.74	1.22	.371
Coal [7] ... tons	78.6	388.69	.026	.126
Oil [7]		50.00		.016
Miscellaneous expenses [8]		629.71		.204
Subsistence [1]		2,308.80		.751
Steamboat expenses [2]		800.00		.260
Labor [3]		2,374.21		.772
Supervision [4]		721.63		.235
Total		13,291.05		

Grading (2,500 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal [7] ... tons	132.8	$657.86	0.053	$0.263
Oil [7]		44.31		.018
Miscellaneous expenses [8]		93.71		.037
Subsistence [1]		907.34		.363
Labor [3]		1,723.75		.689
Total		3,426.97		

---

[1] This item is the cost of the served ration.

[2] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[3] Includes wages of all employed on the work except those specified in 4.

[4] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

[5] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[6] The reported cost of the material is the cost delivered on the job.

[7] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[8] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

Paving (concrete, 1,582 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Cement[1] .... sacks..	6,940	$3,400.60	4.39	$2.15
Sand and gravel[1] .... cubic yards..	2.095	1,592.20	1.32	1.007
Coal[2] .... tons..	56	277.20	.035	.175
Subsistence[3]		942.50		.596
Steamboat expenses[4]		200.00		.126
Labor[5]		2,007.78		1.269
Supervision[6]		357.81		.226
Total		8,778.09		

Summary of costs (linear feet revetted, 1,100).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost	$11.77	$36,209.55	$7.72	$12,205.06	$48,414.61	$44.01
Office expenses					1,452.44	8.79
Surveys[7]					196.00	
Care of plant[8]					1,327.26	
Repair of plant					2,752.32	
Depreciation of plant[9]					3,944.14	
Total					58,086.77	52.80

[1] The reported cost of the material is the cost delivered on the job.

[2] These items include only the coal and oil used on the graders, upper bank-paving machinery, and and pumps. The coal used on tenders and towboats will not be included under this heading.

[3] This item is the cost of the served ration.

[4] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[5] Includes wages of all employed on the work except those specified in 6.

[6] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

[7] This item includes actual cost of survey work done on this revetment.

[8] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[9] Depreciation in to be taken at 6 per cent of first cost per annum for all plant with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

ASHBROOK NECK REVETMENT (446 L.), THIRD DISTRICT—REPAIR WORK.

Willow mattresses, total area 637 squares (connecting, 100 per cent).

BUILDING MATS.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization[1]	....	$550.00	....	$0.863
⅜-inch strand[2] .... pounds	5,742	413.42	9.07	.649
¼-inch strand[2] .... do	8,676	589.97	13.62	.926
$\frac{1}{16}$-inch strand[2] .... do	1,120	63.84	1.76	.100
Staples[2] .... number	25	.92	.04	.002
Spikes[2] .... do	200	6.20	.31	.010
Brush and poles[2] .... cords	1.474	2,269.96	2.31	3.563
Coal[3] .... tons	24	118.80	.04	.186
Miscellaneous expenses[4]	....	300.00	....	.471
Steamboat expenses[5]	....	250.00	....	.392
Labor[6]	....	1,029.48	....	1.616
Supervision[7]	....	510.00	....	.801
Total	....	6,103.09	....	....

BALLASTING AND SINKING MATS.

	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization[1]	....	$350.00	....	$0.549
Stone[2] .... tons	510	1,174.00	0.80	1.843
Coal[3] .... do	16	79.20	.02	.124
Miscellaneous expenses[4]	....	100.00	....	.157
Steamboat expenses[5]	....	450.00	....	.707
Labor[6]	....	178.12	....	.280
Supervision[7]	....	89.50	....	.141
Total	....	2,420.82	....	....

Grading (1,600 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal[3] .... tons	43.2	$213.84	0.05	$0.134
Oil[3]	....	38.62	....	.024
Miscellaneous expenses[4]	....	130.52	....	.082
Subsistence[8]	....	375.33	....	.235
Labor[6]	....	905.14	....	.566
Total	....	1,663.45	....	....

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and allarticles used to replace plant or equipment are to be charged to plant.

[5] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[6] Includes wages of all employed on the work except those specified in 7.

[7] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

[8] This item is the cost of the served ration.

Stone (paving, 805 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Stone [1] ....tons..	1,623	$4,158.50	2.02	$5.166
Coal [2] ....do....	31.4	155.43	.04	.193
Miscellaneous expenses [3]	....	100.00	....	.124
Subsistence [4]	....	596.70	....	.741
Steamboat expenses [5]	....	300.00	....	.372
Labor [6]	....	1,254.16	....	1.558
Supervision [7]	....	159.87	....	.198
Total....	....	6,724.66	....	....

Summary of costs—Repair work.

	Subaqueous work.		Upper bank work.		Grand total.
	Per square.	Total.	Per square.	Total.	
Total field cost [8]	$11.81	$8,523.91	$10.41	$8,388.11	$16,912.02
Office expenses....	....	....	....	....	492.36
Total....	....	....	....	....	17,404.38

---

[1] The reported cost of material is the cost delivered on the job.

[2] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[3] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[4] This item is the cost of the served ration.

[5] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[6] Includes wages of all employed on the work except those specified in 7.

[7] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

[8] In adding total field cost omit totals under headings "Per square."

Dike.—The construction of an earthwork levee dike was resumed on July 14 by the two Bucyrus drag-line levee machines *B-4* and *B-5*. Very good progress was made during the working season, although much time was lost on account of serious labor shortage, both by the clearing contractor and by the day-labor force. Severe freezing winter weather during December and January also delayed the work, the delays preventing the closing of the gap between the existing levee dike and the new dike. Early in February an approaching high water made it necessary to suspend work and secure the end of the new part of the dike. Work was continued with one machine enlarging the existing levee dike extending from the controlling levee a length of 1,900 feet and to which the new portion of the dike is to be joined.

During the year 537,276 cubic yards of earthwork was placed at a cost of $89,465.61, which completes a total of 24,800 feet of dike to date, containing a total of 959,946 cubic yards, there remaining to complete 1,500 feet containing approximately 115,000 cubic yards.

The damage from last season's high water at the extreme lower end of the new part of the dike was repaired and a secondary dike was built across deep washes in the borrow pits and end of this dike paved with concrete. A total of 61,971 cubic yards of earthwork was placed, and 290 squares of concrete pavement. This work cost $35,768.09, which was charged to maintenance.

Conditions at end of year.—The present effective length of the revetment is 12,250 feet, and the levee dike, 26,700 feet; all in good condition. Caving continues below the revetment and a further extension downstream of about 3,000 feet will be needed to effectively protect the dike.

The expenditures on this work to end of present year for new work amounts to $663,649.13, and for maintenance, $366,895.30, a total of $1,030,544.43.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The work accomplished has prevented a cut-off and permanently fixed the channel.

Proposed operations.—It is proposed to extend the revetment about 2,000 feet downstream, and to complete the spur levee, 26,300 feet in length, authorized May 22, 1915.

Recommended modifications of project.—None.

Reference to published articles not previously reported.—None.

(*c*) *Panther Forest, Ark.*

Location and description.—Four hundred and fifty-two miles below Cairo, right bank. Bank revetment.

Original condition.—Caving has been in progress since the earliest surveys—1879 and 1880. In 1908 the controlling levee line was threatened at a point where relocation would have been expensive on account of having to cross an old river bed.

Previous projects.—None.

Existing projects.—To protect the large and important levee line at this locality and to permanently locate the channel.

Operations and results during the present year.—All the uncompleted bank work along the previous year's work was completed. Reinforcing and connecting mats were sunk all along the lower half of the work where the upper bank paving had sloughed. All the sloughs were graded but not paved; 1,812 squares of willow subaqueous mats and 1,895 squares of concrete upper bank paving were placed. The cost of this work amounted to $38,409.35, of which $27,131.44 is chargeable to maintenance and $11,277.91 to new work. Details of costs and expenditures are given in the tables following, and location of work is shown on accompanying plate No. 4.

PANTHER FOREST REVETMENT (452 R.), THIRD DISTRICT.

Mattresses, total area 1,812 squares.

BUILDING WILLOW MATS.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]		$1,248.48		$0.689
5/16-inch strand [2] ....pounds..	6,950	396.15	3.84	.218
3/8-inch strand [2] ....do....	19,200	1,382.40	10.60	.762
1/2-inch strand [2] ....do....	22,825	1,584.10	12.60	.874
1/4-inch strand [2] ....do....	250	18.12	1.14	.01
Staples [2] ....number..	320	11.84	.17	.007
Spikes [2] ....do....	100	3.10	.05	.002
Brush and poles [2] ....cords.	2,912	4,484.48	1.75	2.475
Coal [3] ....tons..	36.8	182.16	.02	.101
Miscellaneous expenses [4]		571.72		.315
Subsistence [5]		885.29		.488
Steamboat expenses [6]		450.00		.248
Labor [7]		1,562.61		.862
Supervision [8]		1,020.00		.563
Total		13,800.45		

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[5] This item is the cost of the served ration.

[6] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[7] Includes wages of all employed on the work except those specified in 8.

[8] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

PANTHER FOREST REVETMENT (452 R.), THIRD DISTRICT—continued.

Mattresses, total area 1,812 squares—Continued.

BALLASTING AND SINKING MATS.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]	....	$624.24	....	$0.344
Stone [2] .... tons..	2,085	5,212.50	1.14	2.877
Coal [3] .... do....	24.6	121.77	.013	.067
Miscellaneous expenses [4]	....	410.00	....	.226
Subsistence [5]	....	327.68	....	.181
Steamboat expenses [6]	....	300.00	....	.166
Labor [7]	....	457.50	....	.253
Supervision [8]	....	250.00	....	.137
Total	....	7,703.69	....	....

Grading (2,035 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal [3] .... tons..	118.7	$587.56	0.058	$0.288
Oil [3]	....	29.97	....	.015
Miscellaneous expenses [4]	....	240.00	....	.216
Subsistence [5]	....	1,523.33	....	.748
Labor [7]	....	2,127.72	....	1.045
Total	....	4,508.58	....	....

Paving (concrete, 1,895 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]	....	$624.24	....	$0.329
Stone [2] .... tons..	223	557.50	0.118	.294
Cement [2] .... sacks..	7,754	3,799.46	4.09	2.005
Sand and gravel [2] .... cubic yards..	2,340	1,778.40	1.23	.939
Coal [3] .... tons..	54	267.30	.003	.141
Miscellaneous expenses [4]	....	250.00	....	.132
Subsistence [5]	....	1,409.33	....	.744
Labor [7]	....	1,847.47	....	.975
Supervision [8]	....	744.21	....	.393
Total	....	11,277.91	....	....

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarter or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[5] This item is the cost of the served ration.

[6] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[7] Includes wages of all employed on the work except those specified in 8.

[8] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

PANTHER FOREST REVETMENT (452 R.), THIRD DISTRICT—continued.

Summary of costs—Repair work.

	Subaqueous work.		Upper bank work.		Grand total.
	Per square.	Total.	Per square.	Total.	
Total field cost	$11.86	$21,504.14	$8.33	$15,786.49	$37,290.63
Office expenses					1,118.72
Surveys [1]					112.00
Care of plant [2]					798.26
Repair of plant					1,653.24
Depreciation of plant [3]					2,369.12
Total					43,341.97

---

[1] This item includes actual cost of survey work done on this revetment.

[2] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[3] Depreciation in to be taken at 6 per cent of first cost per annum for all plant with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of year.—The effective length of the revetment is 7,500 feet, all in good condition except one break in the upper bank between ranges 16 and 20, which occurred during the February, 1918, rise. Active caving continued above and below the revetment, and an extension upstream of about 1,000 feet will be required the coming year in order to protect the controlling levee line.

The expenditures on this work to end of present year for new work amounts to $281,242.03, and for maintenance $236,849.57, a total of $518,091.60.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The bank has been held, the levee saved, and the channel permanently located.

Proposed operations.—It is proposed to make necessary repairs to maintain work in good condition, and to extend revetment upstream 1,000 feet.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(*d*) *Leland Neck, Ark.*

Location and description.—Four hundred and seventy-one miles below Cairo, right bank. Bank revetment.

Original condition.—In 1880 the width of the neck at the narrowest point was approximately 5,500 feet. The banks continued to cave at this point until the width of the neck was reduced to 2,600 feet, and it was necessary to revet the bank to prevent a cut-off. A cut-off at this point would have had a disastrous effect on the regimen of the river similar to that described at Ashbrook Neck.

Previous projects.—None.

Existing project.—To prevent a cut-off and fix the channel by bank revetment.

Operations and results during the present year.—None.

Condition at end of year.—Effective length 5,000 feet, all in good condition. Caving continued above and below the revetment at a moderate rate. The expenditures on this work to end of present year for new work amount to $187,956, and for maintenance $8,885.66, a total of $196,841.66.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The revetment placed at this point has protected the bank, prevented a cut-off, and permanently located the channel.

Proposed operations.—It is proposed to make necessary repairs to maintain the work in good condition.

Recommended modification of project.—None.

References to published articles not previously reported.—None.

(*e*) *Greenville Harbor, Miss.*

Location and description.—Four hundred and seventy-three miles below Cairo, left bank. Bank revetment.

Original condition.—Caving has been in progress since the earliest surveys—1879–80. During the 12 years from 1882 to 1894 the bank in the Greenville Bend receded about 4,000 feet. A large portion of the town of Greenville had caved into the river and the complete demolition of the remainder of the town and harbor was threatened. New levee loops had been repeatedly constructed to cover the front line being breached by caving, and been in turn destroyed.

Previous projects.—The original project, adopted in 1887, provided for protection of the bank by means of submerged spur dikes.

Existing project.—Adopted in 1891, provides for protection of the bank with continuous revetment.

Operations and results during the present year.—A standard fascine channel mat 1,000 by 255 feet was sunk together with the necessary connecting mats, which extended the effective revetment downstream 1,070 feet. Between ranges 80 and 87, for a length of 700 feet at the upper end of the new extension, the slope was graded with teams to 7 horizontal to 1 vertical, extending from top of controlling levee line to low water, and the material excavated was used to construct 1,330 linear feet of levee to commission grade and section. The levee work was paid for from allotment of flood-control funds made to the Lower Yazoo levee district.

The slope was paved with concrete 7 inches thick constructed under standard road specifications. The surface was grooved in imitation of cobblestone. The top of the levee and two road crossing on the land side of the levee were also paved. This work was done in cooperation with the city of Greenville as noted in paragraph on "Local cooperation." The work done aggregated 3,418 squares of subaqueous willow mats placed, 490 squares of brush and stone revetment, 746 squares of upper bank paved with ordinary concrete 4 inches thick, and 1,904 squares paved with extra concrete 7 inches thick for city wharf, requiring 4,565 cubic yards of concrete at a unit cost of $22.78 per square. The total expenditures were as follows:

For standard revetment and pavement	$49,176.87
For city wharf pavement	43,380.13
Total	$92,557.00

all of which is charged to new work. Details of costs and expenditures are given in the tables following, and location of work is shown on accompanying plate No. 5.

GREENVILLE REVETMENT (478 L.), THIRD DISTRICT—NEW WORK.

Mattresses, total area 3,908 squares (channel, 75 per cent; connecting, 25 per cent).

BUILDING WILLOW MATS.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]	....	$1,175.37	....	0.301
⅝-inch strand [2] ....pounds..	36,400	2,620.80	9.31	.670
¼-inch strand [2] ....do....	28,000	1,904.00	7.16	.487
7/16-inch strand [2] ....do....	12,200	595.40	3.12	.152
½-inch strand [2] ....do....	500	36.25	.13	.009
Staples [2] ....number..	690	25.53	.18	.007
Spikes [2] ....do....	400	12.40	.10	.003
Brush and poles [2] ....cords..	5,839	8,992.06	1.48	2.301
Rope, manila [2] ....pounds..	3,856	1,156.74	.98	.296
Coal [3] ....tons..	21.6	106.92	.005	.027
Miscellaneous expenses [4]	....	534.27	....	.136
Subsistence [5]	....	1,898.67	....	.485
Steamboat expenses [6]	....	550.00	....	.141
Labor [7]	....	5,245.74	....	1.342
Supervision [8]	....	1,700.04	....	.435
Total	....	26,554.19	....	....

BALLASTING AND SINKING MATS.

	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]	....	$587.68	....	$0.150
Stone [2] ....tons..	2,917	7,292.50	0.75	1.866
Rope, manila [2] ....pounds..	3,856	1,156.74	.98	.296
Coal [3] ....tons..	49	242.55	.013	.062
Miscellaneous expenses [4]	....	325.00	....	.083
Subsistence [5]	....	243.67	....	.062
Steamboat expenses [6]	....	350.00	....	.090
Labor [7]	....	1,421.25	....	.364
Supervision [8]	....	400.00	....	.102
Total	....	12,019.39	....	....

Grading (1,550 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal [3] ....tons..	134.5	$665.77	0.87	$0.429
Oil [3]	....	12.08	....	.008
Miscellaneous expenses [4]	....	290.00	....	.187
Subsistence [5]	....	708.67	....	.457
Labor [7]	....	2,027.53	....	1.30
Total	....	3,704.05	....	....

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[5] This item is the cost of the served ration.

[6] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[7] Includes wages of all employed on the work except those specified in 8.

[8] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

GREENVILLE REVETMENT (478 L.), THIRD DISTRICT—NEW YORK—continued.

Paving (746 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]	....	$587.68	....	$0.787
Cement [2] ....sacks..	2,622	1,284.78	3.50	1.722
Sand and gravel [2] ....cubic yards..	1,160	881.60	1.56	1.181
Coal [3] ....tons..	56	277.20	.08	.372
Miscellaneous expenses [4]	....	285.00	....	.382
Subsistence [5]	....	451.33	....	.605
Labor [6]	....	1,199.32	....	1.607
Supervision [7]	....	500.00	....	.684
Total	....	5,466.91	....	....

Summary of costs (linear feet revetted, 1,070).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost	$9.87	$38,578.58	$12.29	$9,170.96	$48,744.54	$40.56
Office expenses	....	....	....	....	1,432.33	12.87
Surveys [8]	....	....	....	....	504.00	
Care of plant [9]	....	....	....	....	1,042.24	
Repair of plant [9]	....	....	....	....	2,161.22	
Depreciation of plant [10]	....	....	....	....	8,097.07	
Total	....	....	....	....	56,981.40	53.43

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[5] This item is the cost of the served ration.

[6] Includes wages of all employed on the work except those specified in 7.

[7] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

[8] This item includes actual cost of survey work done on this revetment.

[9] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[10] Depreciation is to be taken at 6 per cent of first cost per annum for all plants with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of year.—The effective length of the revetment is 23,000 feet, all in good condition except that in places the upper slope needs to be flattened and the pavement reinforced. The extreme upper end of the new city pavement below a stage of 25 feet was not completed, on account of freezing weather preventing the laying of concrete, and the rapidly rising river when weather was favorable. This work will be completed as soon as the water falls.

Only nominal caving has occurred above the revetment and no caving below. Thorough repairs as noted above will probably be all that will be required the coming season.

The expenditures on this work to end of present year for new work amount to $1,260,752.63, and for maintenance $350,114.32, a total of $1,610,866.95.

Local cooperation.—The town of Greenville contributed $42,277.10 in 1887, and in 1917 contributed $35,500 for use in connection with revetment extension and construction of graded and paved slope for use as wharf.

Terminal facilities.—The slope on a frontage of about 600 feet has been graded to a 7 horizontal to 1 vertical slope, and paved with concrete suitable for traffic; pavement extending from low-water line to top of levee. Pavement to be used in connection with wharf boat or other landing facilities not yet provided. No connections with railroads have been made.

Effect of improvement.—The bank in this bend as far as revetted has been held, and the channel has been permanently located. The entire city of Greenville has been protected; confidence in the stability of the river bank has been restored, permitting the city to grow normally without fear of destruction, and further expensive retirements of the controlling levee line have been made unnecessary.

Proposed operations.—It is proposed to make such repairs and extensions as may be necessary for maintenance.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(*f*) *Vaucluse, Ark.*

Location and description.—Four hundred and eighty-seven miles below Cairo, right bank. Bank revetment.

Original condition.—The levee at this point was built near the lower end of Lake Chicot and could not be set back without great cost. Caving has been in progress since the earliest surveys, 1879–80, and had caused the bank to approach so close to the levee as to endanger its further life unless revetment was placed.

Previous projects.—None.

Existing project.—The present project is to protect the levee by means of continuous bank revetment.

Operations and results during the present year.—None.

Condition at end of year.—Effective length of the revetment is 3,925 feet; all in good condition except upper slope needs to be flattened in places and pavement reinforced. The expenditures on this work to end of present year for new work amount to $161,042, and for maintenance, $23,324.60, a total of $184,366.60.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The work accomplished has protected the bank, thus obviating the necessity of building a new and expensive loop, and has permanently located the channel.

Proposed operations.—It is proposed to make such repairs and extensions as may be necessary for maintenance.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(*g*) *Longwood, Miss.*

Location and description.—Five hundred miles below Cairo, left bank. Bank revetment.

Original condition.—Caving has been in progress since the earliest surveys—1879–80. In 1904 the Longwood Levee, one of the largest on the river, was threatened, and careful investigation proved that bank revetment would be cheaper than a relocation of the levee.

Previous projects.—None.

Existing project.—To protect the large and important levee line at this locality, by bank revetment.

Operation and results during present year.—None.

Condition at end of year.—The effective length of the work is 4,200 feet, all in good condition and shielded from the direct flow of the main current of the river by a sand bar which has formed opposite the work.

The expenditures on this work to end of present year all for new work amount to $153,607.08.

Local cooperation.—The Board of Mississippi Levee Commissioners contributed $11,009.45 in 1905.

Terminal facilities.—None.

Effect of improvement.—The caving which had been proceeding for more than 25 years was effectively checked. The construction of a levee loop estimated to cost $793,000 was obviated with an expenditure of a little over $150,000. The channel has been permanently located.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(*h*) *Grand Lake, Ark.*

Location and description.—Five hundred and ten miles below Cairo, right bank. Bank revetment.

Original condition.—The levee at this point was built across the bed of Grand Lake, where a new loop would have been very expensive. Caving has been in progress since the earliest surveys—1879–80, and by 1911 had so reduced the distance between the bank and the levee as to make it essential to either revet the bank or build a new levee.

Previous projects.—None.

Existing project.—To protect the levee and fix the channel at this point by means of continuous bank revetment.

Operations and results during the present year.—The break in the upper bank paving between ranges 76 and 80 was repaired, which required the following work: 933.1 squares of subaqueous willow mats and 272 squares of upper bank pavement with stone. An extension of 2,000 feet downstream was included in the project for this year's work, but owing to delays experienced at other points on account of severe freezing weather in December and January, and to the fact that a part of the outfit and organization assigned to do this work was loaned to the New Orleans engineering district for emergency work at the Passes, it was impossible to start work on the extension.

The amount expended during the year was $13,934.08, all of which was for maintenance. Details of costs of work are given in the following tables, and location of work is shown on accompanying plate No. 6.

GRAND LAKE REVETMENT (510 R.), THIRD DISTRICT—REPAIR WORK.

Mattresses, total area 933 squares (connecting 100 per cent).

BUILDING WILLOW MATS.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]		$917.93		$0.984
⅜ inch strand [2] ....pounds	5,000	340.00	5.36	.375
5/16 inch strand [2] ....do	3,400	193.80	3.70	.208
Brush and poles [2] ....cords	1,516	2,334.64	1.62	2.50
Coal [3] ....tons	8.6	42.57	.009	.046
Miscellaneous expenses		239.45		.256
Subsistence [4]		420.66		.450
Steamboat expenses [5]		125.00		.134
Labor [6]		738.79		.792
Supervision [7]		637.59		.683
Total		5,990.43		

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This item is the cost of the served ration.

[5] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[6] Includes wages of all employed on the work except those specified in 7.

[7] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

GRAND LAKE REVETMENT (510 R.), THIRD DISTRICT—REPAIR WORK—continued.

Mattresses, total area 933 squares (connecting 100 per cent)—Continued.

BALLASTING AND SINKING MATS.

	Quanity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization[1]		$917.94		$0.984
Stone[2] tons	1,147	2,867.50	1.23	3.073
Coal[3] do	11.2	54.54	.012	.058
Miscellaneous expenses[4]		125.00		.134
Subsistence[5]		68.67		.074
Steamboat expenses[6]		175.00		.188
Labor[7]		126.80		.136
Supervision[8]		270.00		.289
Total		4,605.45		

Grading (1,205 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal[3] tons	17.6	$87.12	0.014	$0.072
Oil[3]		32.75		.027
Miscellaneous expenses[4]		22.50		.019
Subsistence[5]		209.33		.174
Labor[7]		524.53		.435
Total		876.23		

Paving (272 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Stone[2] tons	633	$1,582.50	2.33	$5.82
Coal[3] do	3.7	18.32	.013	.067
Miscellaneous expenses[4]		75.00		.276
Subsistence[5]		96.67		.355
Labor[7]		153.63		.565
Supervision[8]		130.00		.478
Total		2,056.12		

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[5] This item is the cost of the served ration.

[6] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[7] Includes wages of all employed on the work except those specified in 8.

[8] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

GRAND LAKE REVETMENT (510 R.), THIRD DISTRICT—REPAIR WORK—continued.

Summary of costs—Repair work.

	Subaqueous work.		Upper bank work.		Grand total.
	Per square.	Total.	Per square.	Total.	
Total field cost	$11.36	$10,595.88	$10.78	$2,932.35	$13,528.23
Office expenses					405.85
Surveys[1]					112.00
Care of plant[2]					463.21
Repair of plant					960.53
Depreciation of plant[3]					1,276.46
Total					16,746.28

[1] This item includes actual cost of survey work done on this revetment.

[2] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[3] Depreciation is to be taken at 6 per cent of first cost per annum for all plant with untreated wood hulls; 5 per cent for all plants with treated (creosoted) wooden hulls; and 4p er cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of year.—The present effective length of the revetment is 3,500 linear feet, all in good condition except about 300 feet at lower end, where excessive flanking has occurred, due to rapid downstream caving. The extension downstream of 2,000 feet already provided for will be completed this season. An additional 1,000 feet should also be placed in order to effectively protect the large levee dike covering the head of Grand Lake. The expenditures on this work to the end of the present year for new work amount to $259,903.66, and for maintenance $20,457.08, a total of $280,360.74.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The work accomplished has permanently fixed the channel, protected the bank, and obviated the necessity of building a new and costly levee.

Proposed operations.—It is proposed to make necessary repairs and extend revetment downstream 2,000 feet.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(i) *Princeton, Miss.*

Location and description.—Five hundred and fourteen miles below Cairo, left bank. Bank revetment.

Original condition.—The controlling levee line at this point could not again be retired without crossing the bed of Lake Jackson. Caving has been in progress since the earliest surveys—1879–80. In 1917 the distance from levee to shore line was so reduced as to make the revetment of the bank necessary in order to save the levee.

Previous projects.—None.

Existing project.—To protect the levee and fix the channel in this bend by means of continuous bank revetment.

Operations and results during the present year.—Work of manufacturing the new type of reinforced concrete subaqueous mats to be used at this point was commenced in October and continued until 3,129 squares were loaded on barges, which was sufficient to place mats along 1,000 linear feet. During December and January this work was forced to suspend on account of the severe freezing winter weather, conditions making the manufacture of concrete blocks impracticable. Work of sinking the blocks along a reach of about 200 feet which had been previously graded and prepared was commenced and 1,414 squares were sunk in place covering a reach of about 700 feet, which covered all the graded bank that had not caved off in advance of the sinking operations.

The total cost of work amounts to $30,403.35, all of which was for new construction. Details of costs and expenditures are given in the tables following, and the location of the work is shown on accompanying plate No. 7.

PRINCETON REVETMENT (514 L.), THIRD DISTRICT—NEW WORK.

Mattresses, total area 1,414 squares).

BUILDING CONCRETE MATS (3,129 SQUARES).[1]

	Quantity used.		Per square	
	Total quantity.	Total cost.	Quantity.	Cost.
Concrete mats[2]....squares..	3,129	$20,025.60	....	$6.40

SINKING CONCRETE MATS.

	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization[3]....	....	2,295.67	....	1.623
½-inch strand[2]....pounds..	21,210	1,537.73	15.0	1.088
½-inch clips[2]....do....	9,900	673.20	7.00	.476
Coal[4]....tons..	41	213.25	.3	.151
Miscellaneous expenses[5]....	....	475.00	....	.336
Subsistence[6]....	....	394.67	....	.278
Steamboat expenses[7]....	....	100.00	....	.071
Labor[8]....	....	675.75	....	.477
Supervision[9]....	....	1,198.83	....	.847
Total....	....	7,564.10	....	....

Grading (1,200 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal[4]....tons..	97.3	$481.63	0.08	$0.401
Oil[4]....	....	14.60	....	.012
Miscellaneous expenses[5]....	....	126.50	....	.105
Subsistence[6]....	....	204.67	....	.220
Labor[8]....	....	1,040.72	....	.867
Total....	....	1,928.12	....	....

---

[1] For detailed statement of costs of building concrete mats see Ashbrook Neck revetment.

[2] The reported cost of the material is the cost delivered on the job.

[3] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[4] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[5] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[6] This item is the cost of the served ration.

[7] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[8] Includes wages of all employed on the work except those specified in 9.

[9] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

PRINCETON REVETMENT (514 L.), THIRD DISTRICT—NEW WORK—continued.

Summary of costs (linear feet revetted, 700)—not complete.

	Subaqueous work.		Upper bank work.		Grand total.
	Per square.	Total.	Per square.	Total.	
Total field cost	$19.51	$27,589.70	$1.61	$1,928.12	$29,517.82
Office expenses					885.53
Surveys [1]					84.00
Care of plant [2]					485.48
Repair of plant					1,006.72
Depreciation of plant [3]					1,442.66
Total					33,422.21

[1] This item includes actual cost of survey work done on this revetment.

[2] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[3] Depreciation is to be taken at 6 per cent of first cost per annum for all plant with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of year.—Mats were sunk along a reach of 700 feet, but the upper bank pavement could not be placed, and as a consequence, a portion of the grade above the mats has been lost on account of wave wash. The shore line continues to cave rapidly above and below the mats that were placed. Just as soon as the stage of river permits, work of constructing 3,000 feet of revetment will be completed which will protect the controlling levee line.

There have been no expenditures on this work prior to the present year. Expenditures for this year are shown in the preceding paragraph.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—Work just commenced, no effect as yet.

Proposed operations.—It is proposed to complete the construction of about 3,000 feet of standard bank revetment.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(j) *Lake Providence Reach.*

Location and description.—Five hundred and seventeen to five hundred and fifty miles below Cairo. Bank revetment.

Original condition.—This and Plum Point Reach were originally selected by the commission for improvement, on account of the exceptional difficulties encountered there. Caving was excessive; the channel was not clearly defined, being divided into numerous branches by islands, and depths as small as 4½ feet were occasionally found on its crossings.

Previous projects.—The original project adopted in 1881 provided for securing a low-water channel with an approximately uniform width of 3,000 feet, by constructing contraction works, closing all chutes, and holding caving banks. In 1896 due to the development of hydraulic dredging, the project for the reach as a whole was definitely abandoned, with the exception of repairs to revetments.

Existing project.—Repairs to revetments.

Operations and results during the present year.—None.

Condition at end of year.—A total of 23,900 feet of effective revetment is in place at Louisiana Bend, La., and Lake Providence, La., all in good condition, both reaches are covered by towheads or bars and not subject to the direct attack from the river.

The total expenditures on this work aggregate $3 943,668.70, which includes both new work and maintenance.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—Caving was effectively checked at Louisiana Bend and in the bend above Lake Providence. The channel of the river was stabilized and depths on all crossings increased.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(*k*) *Fitlers Bend, Miss.*

Location and description.—Five hundred and fifty miles below Cairo, left bank. Bank revetment.

Original condition.—Caving has been in progress since the earliest surveys—1879–80. In 1906 the large levee at Fitlers became endangered from caving, and investigations showed revetment to be cheaper than a relocation of the levee.

Previous projects.—None.

Existing project.—To fix the channel, and prevent the destruction of the controlling levee line at this point by bank revetment.

Operations and results during the present year.—Work was commenced at this point early in July, and all pavement and work remaining from previous season was completed. Channel mats aggregating 3,665 feet in length were constructed and sunk in place reinforcing previous work. The upper bank was graded where failures had occurred, to a slope of 3 to 4 to 1, and an extra heavy concrete pavement connecting with new mats was laid, extending well over the soft sandy stratus which had previously been the cause of bank failures. All the work was made extra heavy and thorough precautions taken to make the new work effective. Repairs to the upper and lower end of the revetment were made, restoring a length of 4,750 feet as effective revetment previously reported destroyed. The work done is summarized as follows:

	Squares.
Willow subaqueous mats placed	9,335
Upper bank paved with concrete	2,806

The amount expended during the year was $120,128.67, all of which is charged to maintenance. Details of costs of work are given in the following tables, and location of work is shown on accompanying Plate No. 8:

FITLERS BEND, MISS. (550 L.), THIRD DISTRICT—NEW WORK.

Mattresses, total area 9,335 squares (channel, 86 per cent; connecting, 14 per cent).

BUILDING WILLOW MATS.

	Quantity used.		Per square	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]	....	$1,466.54	....	$0.157
3/8-inch strand [2] ....pounds	53,735	3,868.92	5.76	.414
1/4-inch strand [2] ....do	88,230	5,989.64	9.45	.642
5/16-inch strand [2] ....do	31,602	1,801.31	3.37	.193
3/8-inch clips [2] ....do	500	47.50	.054	.005
Staples [2] ....number	1,252	46.32	.13	.005
Spikes [2] ....do	1,000	31.00	.107	.003
Brush and poles [2] ....cords	14,623	22,519.42	1.56	2.412
Rope, manila [2] ....pounds	7,711.6	2,313.48	.82	.248
Coal [3] ....tons	29.8	147.51	.003	.016
Miscellaneous expenses [4]	....	550.46	....	.059
Subsistence [5]	....	6,542.00	....	.701
Steamboat expenses [6]	....	800.00	....	.086
Labor [7]	....	10,210.92	....	1.092
Supervision [8]	....	2,879.71	....	.309
Total	....	59,214.73	....	....

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[5] This item is the cost of the served ration.

[6] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[7] Includes wages of all employed on the work except those specified in 8.

[8] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

FILTERS BEND, MISS. (550 L.), THIRD DISTRICT—NEW WORK—continued.

Mattresses, total area 9,335 squares (channel, 86 per cent; connecting, 14 per cent)—Continued.

BALLASTING AND SINKING.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization[1]	....	$733.27	....	$0.079
Stone[2] ....tons..	8,773	21,932.50	0.94	2.349
Rope, manila[2] ....pounds..	7,711.6	2,313.48	.83	.248
Coal[3] ....tons..	12.6	62.37	.001	.007
Miscellaneous expenses[4]	....	385.00	....	.041
Subsistence[5]	....	2,212.00	....	.237
Steamboat expenses[6]	....	600.00	....	.064
Labor[7]	....	3,406.93	....	.365
Supervision[8]	....	1,250.00	....	.134
Total	....	32,895.55	....	....

Grading (2,870 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal[3] ....tons..	139	$688.05	0.048	$0.239
Oil[3]	....	32.50	....	.011
Miscellaneous expenses[4]	....	225.00	....	.078
Subsistence[5]	....	2,099.80	....	.732
Labor[7]	....	4,091.57	....	1.426
Total	....	7,136.92	....	....

Paving (2,806 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization[1]	....	$733.27	....	$0.258
Cement[2] ....sacks..	10,181	4,988.69	3.62	1.778
Sand and gravel[2] ....cubic yards..	4,063	3,087.88	1.45	1.100
Coal[3] ....tons..	9.2	45.54	.003	.016
Miscellaneous expenses[4]	....	175.00	....	.062
Subsistence[5]	....	2,961.37	....	1.055
Labor[7]	....	4,640.83	....	1.654
Supervision[8]	....	750.00	....	.260
Total	....	17,382.58	....	....

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[5] This item is the cost of the served ration.

[6] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[7] Includes wages of all employed on the work except those specified in 8.

[8] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

FILTERS BEND, MISS. (550 L.), THIRD DISTRICT—NEW WORK—continued.

Summary of costs (linear feet revetted, 4,750).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost	$9.87	$92,110.28	$8.54	$24,519.50	$116,629.78	$24.55
Office expenses					3,498.89	3.59
Surveys [1]					168.00	
Care of plant [2]					2,213.63	
Repair of plant					4,590.29	
Depreciation of plant [3]					6,577.99	
Total					133,678.58	28.14

---

[1] This item includes actual cost of survey work done on this revetment.

[2] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[3] Depreciation in to be taken at 6 per cent of first cost per annum for all plant with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of year.—The present effective length is 13,200 linear feet, all in good condition except about 750 squares of upper bank pavement, the completion of which was prevented on account of freezing weather in December and January and rapid rise in river after weather became warm enough to lay concrete. This work will be completed just as soon as the river reaches a stage at which the work can be done. Only nominal caving has occurred below the revetment.

The expenditures on this work to the end of the present year for new work amount to $501,701.90, and for maintenance, $272,280.36, a total of $773,982.26.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—Caving has been effectively checked along the full reach revetted, and the channel has been fixed in position. The relocation of a long line of levee has been obviated.

Proposed operations.—It is proposed to make repairs and extensions as may be necessary.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(1) *Cottonwood, Miss.*

Location and description.—Five hundred and fifty-eight miles below Cairo, left bank. Bank revetment.

Original condition.—Prior to 1913 this bank had been relatively stable for many years, but following the 1913 flood serious caving set in, which amounted to 400 feet in 1914, 1,100 feet in 1915, and 1,500 feet in 1916. In 1915 a new levee was constructed about 1,000 feet back of the old levee, but the caving of the following season destroyed a considerable portion of the work and it became evident that it would be necessary either to fix the channel by means of revetment or else build a levee across the point and throw out a large area of land. Revetment was therefore decided upon.

Previous projects.—None.

Existing project.—To protect the bank, fix the channel in position, and protect the levee by means of continuous revetment along the caving bank in this bend.

Operations and results during the present year.—The uncompleted pavement of the previous year was completed and two channel mats were built and sunk, together with the necessary connecting mats, making extensions of 1,000 feet upstream and 1,000 feet downstream. All work was completed with the exception of a short reach of upper bank pavement which lacked about 15 feet in height, the laying of which was prevented by severe freezing weather in December and January. The work done is summarized as follows:

	Squares.
Willow subaqueous mats placed	7,332
Upper bank paved with concrete	4,337

A levee dike at the lower end of the revetment was also constructed, containing 29,708 cubic yards of earthwork, at a cost of $9,801.99. This was placed in order to prevent the river flanking the revetment by scouring a channel through the levee borrow pits. The amount expended was $115,143.92, all of which was for new work. Details of costs of work are given in the following tables, and location of work is shown on accompanying plate No. 9.

COTTONWOOD, MISS. (558 L.), THIRD DISTRICT—NEW WORK.

Mattresses, total area, 7,332 squares (channel, 77 per cent; connecting, 23 per cent).

BUILDING WILLOW MATS.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]		$2,005.48		$0.274
5/16 inch strand [2] ....pounds..	23,113	1,317.44	3.15	.180
1/4-inch strand [2] ....do....	41,230	2,803.64	5.62	.382
3/8-inch strand [2] ....do....	29,367	2,114.42	4.01	.288
5/16-inch clips [3] ....do....	568	113.03	.01	.015
Staples [2] ....number..	940	34.78	.03	.005
Brush and poles [2] ....cords..	13,648	21,017.92	1.80	2.867
Rope, manila [2] ....pounds..	7,712	2,313.48	1.05	.316
Coal [3] ....tons..	46.7	231.16	.006	.032
Miscellaneous expenses [4]		426.24		.058
Subsistence [5]		4,036.00		.550
Steamboat expenses [6]		450.00		.061
Labor [7]		7,574.70		1.033
Supervision [8]		1,838.33		.251
Total		46,276.62		

BALLASTING AND SINKING.

	Total quantity.	Total cost.	Quantity.	Cost.
Stone [2] ....tons..	7,098	$17,745.00	0.096	$2.420
Rope, manila [2] ....pounds..	7,712	2,313.48	1.05	.316
Coal [3] ....tons..	52.8	261.36	.007	.036
Miscellaneous expenses [4]		300.00		.041
Subsistence [5]		896.67		.122
Steamboat expenses [6]		550.00		.075
Labor [7]		1,947.54		.266
Supervision [8]		1,238.33		.169
Total		25,252.38		

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[5] This item is the cost of the served ration.

[6] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[7] Includes wages of all employed on the work except those specified in 8.

[8] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

COTTONWOOD, MISS. (558 L.), THIRD DISTRICT—NEW WORK—continued.

Grading (5,471 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal [1] ....tons..	174.6	$864.27	0.032	$0.158
Oil [1]	....	35.40	....	.007
Miscellaneous expenses [2]	....	250.00	....	.046
Subsistence [3]	....	2,796.00	....	.511
Labor [4]	....	5,327.42	....	.974
Total	....	9,273.09	....	....

Paving (4,337 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Cement [5] ....sacks..	14,777	$7,130.73	3.40	$1.644
Sand and gravel ....cubic yards..	7,171	5,449.96	1.65	1.256
Coal [1] ....tons..	22.4	110.88	.005	.026
Oil [1]	....	18.75	....	.004
Miscellaneous expenses [2]	....	150.00	....	.035
Subsistence [3]	....	2,558.31	....	.590
Labor [4]	....	4,872.18	....	1.124
Supervision [6]	....	638.32	....	.147
Total	....	20,929.13	....	....

Summary of costs (linear feet revetted, 2,000).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost	$9.76	$71,529.00	$7.00	$30,202.22	$101,731.22	$50.87
Office expenses	....	....	....	....	3,068.19	7.32
Surveys [7]	....	....	....	....	168.00	
Care of plant [8]	....	....	....	....	1,888.50	
Repair of plant	....	....	....	....	3,916.07	
Depreciation of plant [9]	....	....	....	....	5,611.83	
Total	....	....	....	....	116,383.81	58.19

---

[1] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[2] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[3] This item is the cost of the served ration.

[4] Includes wages of all employed on the work except those specified in 6.

[5] The reported cost of the material is the cost delivered on the job.

[6] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

[7] This item includes actual cost of survey work done on this revetment.

[8] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[9] Depreciation in to be taken at 6 per cent of first cost per annum for all plant with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of year.—The present effective length of revetment is 9,900 feet; all in good condition except about 500 squares of concrete upper bank pavement left uncompleted on account of freezing weather in December and January, and which will be completed as soon as stage of river permits. Rapid caving continues above the revetment, and a further extension up stream of from from 2,000 to 3,000 feet will be required this year in order to protect the controlling levee line.

The expenditures on this work to the end of the present year amount to $325,717.58, all of which is for new work.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—Caving has been effectively stopped. The channel has been fixed in position. The controlling levee line has been saved from destruction.

Proposed operations.—It is proposed to make necessary repairs to maintain work in good condition and extend up stream 2,000 feet.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(*m*) *Albemarle Bend, Miss.*

Location and description.—Five hundred and sixty-eight miles below Cairo, left bank. Bank revetment.

Original condition.—The bank in this bend had caved back 2¼ miles since the survey of 1879–80, and destroyed many miles of levees and thousands of acres of valuable land. On account of the proximity of Goose Lake, Five Mile Lake and Steele Bayou behind the existing levee, there was no suitable economical location for a new loop, and it therefore became necessary to take steps to prevent further caving in the bend.

Previous projects.—None.

Existing project.—To protect the levee in this bend by means of continuous bank revetment.

Operations and results during the present year.—None.

Condition at end of year.—Work is in good condition, except for minor breaks in upper bank work; effective length 13,720 feet. In 1913 the main channel of the river made a cut off through Newman's Towhead Chute, since which time the revetment is not subject to the action of the river except at high stages.

The expenditures on this work to the end of the present year for new work amount to $486,033, and $148,109.92+ for maintenance, a total of $634,142.92.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The work accomplished has protected the bank, and obviated the necessity of building a new levee at great cost.

Proposed operations.—It is proposed to make such repairs as may be necessary to maintain the work in good condition.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(*n*) *Delta Point, La.*

Location and description.—Five hundred and ninety-eight miles below Cairo, right bank. Bank revetment.

Original condition.—Succeeding the Centennial Cut-off in 1876, very rapid caving occurred on Delta Point and in the bend above, and the subsequent shoaling of the channel leading from the river along the Vicksburg front practically destroyed the harbor at Vicksburg for low-water commerce.

Previous projects.—In connection with the improvement of Vicksburg Harbor the protection of Delta Point with bank revetment was authorized in the river and harbor act approved June 18, 1878.

Existing project.—The river and harbor act approved August 2, 1882, placed this work under the supervision of the Mississippi River Commission. The continued protection of the point with bank revetment is proposed.

Operations and results during the present year.—None.

Condition at end of year.—The effective length of the revetment is 5,900 feet, all in good condition.

The expenditures on this work to the end of the present year for new work amount to $420,546, and $36,416.29+ for maintenance, a total of $456,962.29.

Local cooperation.—None.

Terminal facilities.—Railway incline and cradle for transferring cars from bank to boats and vice versa, owned by the Mississippi & Louisiana Railway Transfer Co. (Vicksburg route).

Effect of improvement.—Delta Point has been held in exactly the same position as when work was commenced in 1879. The channel of the river has been prevented from being deflected farther away from Vicksburg Harbor and important railroad terminals and incline saved from destruction by caving bank.

Proposed operations.—Proposed to make necessary repairs to maintain work in good condition.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(o) *Vicksburg Harbor, Miss.*

Location and description.—Five hundred and ninety-nine miles below Cairo, left bank. Bank revetment.

Original condition.—Subsequent to the cut-off which occurred in 1876, and prior to the construction of the canal which diverted the Yazoo River along the Vicksburg front, this stretch of bank was not exposed to any current action, and even after the completion of the diversion canal, it suffered no damage until the excessively high floods of 1912 and 1913—although the original section of the canal prism had scoured out to some extent. During the 1912 and 1913 floods, unusually large amounts of water were discharged through the canal as a result of crevasses in the levee system, and caused serious caving along the bank just above the point where the canal enters the Mississippi. Further caving occurred during succeeding high water, resulting in heavy losses to the Vicksburg, Shreveport & Pacific Railway, which was compelled to relocate its tracks, and to the compress companies established on the bank. If permitted to continue, the caving would have compelled the railroad to abandon its present point for crossing the Mississippi, and would have destroyed considerable portions of the cotton sheds belonging to the compress companies. Revetment was therefore determined upon.

Previous projects.—None.

Existing project.—To protect the bank by revetment, and thus save valuable properties, of a more or less public nature, from serious loss or destruction.

Operations and results during the present year.—Work on the completion of the revetment as projected was resumed September 4, minor repairs were made to defects in the upper bank pavement of last year, and the full length of revetment as originally contemplated, embracing an extension of 2,500 feet up stream. All mats placed were of the reinforced concrete subaqueous type, and all upper bank pavement, with the exception of several very boggy reaches near the low waters edge which were covered with brush and stone, was of the standard concrete upper bank pavement type. A summary of work done is as follows:

	Squares.
Concrete subaqueous mats placed	3,910
Concrete upper bank pavement	3,334
Total	7,244

The cost of this work amounted to $60,096.45, all charged to new construction. Details of costs and expenditures are given in the following tables, and location of work in accompanying plate No. 9.

VICKSBURG HARBOR, MISS. (599 L.), THIRD DISTRICT—NEW WORK.

BUILDING CONCRETE MATS.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Concrete mats..........squares..	3,910	$25,024.00	....	$6.40

VICKSBURG HARBOR, MISS. (599 L.), THIRD DISTRICT, NEW WORK—continued.

Sinking concrete mats (3,910 squares).

		Quantity used.		Per square.	
		Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]			$1,705.04		$0.436
½-inch strand [2]	pounds	59,500	4,313.75	12.4	1.103
½-inch clips [2]	do	21,900	1,489.20	5.60	.381
Coal [3]	tons	77	381.15	.02	.098
Miscellaneous expenses [4]			626.34		.160
Subsistence [5]			960.00		.246
Steamboat expenses [6]			500.00		.128
Labor [7]			2,150.90		.550
Supervision [8]			1,796.73		.450
Total			13,922.21		

Grading (2,414 squares).

		Quantity used.		Per square.	
		Total quantity.	Total cost.	Quantity.	Cost.
Coal [3]	tons	122	$606.90	0.031	$0.250
Oil [3]			18.63		.008
Miscellaneous expenses [4]			300.00		.124
Subsistence [5]			1,216.00		.504
Labor [7]			2,237.33		.927
Total			4,375.86		

Concrete paving (3,334 squares).

		Quantity used.		Per square.	
		Total quantity.	Total cost.	Quantity.	Cost.
Brush and poles [2]	cords	206	$317.24	0.062	$0.095
Cement [2]	sacks	12,762	6,253.38	3.83	1.87
Sand and gravel [2]	cubic yards	5,615	4,267.40	1.66	1.28
Coal [3]	tons	47	232.65	.012	.070
Miscellaneous expenses [4]			200.00		.060
Subsistence [5]			1,064.67		.319
Labor [7]			2,184.37		.655
Supervision [8]			207.20		.062
Total			14,726.91		

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[5] This item is the cost of the served ration.

[6] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[7] Includes wages of all employed on the work except those specified in 8.

[8] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

VICKSBURG HARBOR, MISS. (599 L.), THIRD DISTRICT, NEW WORK—continued.

Summary of costs (linear feet revetted, 2,500).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost.	$9.10	$38,946.21	$5.73	$19,102.77	$58,048.98	$23.22
Office expenses					1,747.47	3.26
Surveys [1]					112.00	
Care of plant [2]					1,042.25	
Repair of plant					2,161.23	
Depreciation of plant [3]					3,097.11	
Total					66,209.04	26.48

[1] This item includes actual cost of survey work done on this revetment.

[2] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[3] Depreciation in to be taken at 6 per cent of first cost per annum for all plant with untreated wooden hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of year.—The effective length of revetment placed is 4,300 feet, all in good condition. The original project is completed, and maintenance only will be required in the future.

The total expenditures on this work to end of present year amount to $111,410.62, all for new construction.

Local cooperation.—None.

Terminal facilities.—Railway incline and cradle for transferring cars from bank to boats and vice versa, owned by the Louisiana & Mississippi Railway Transfer Co. (Vicksburg Route). Warehouses and switch tracks of the Yazoo & Mississippi Valley and Alabama & Vicksburg Railways run along the top of the bank along the entire Vicksburg Harbor front. Good landing facilities, but no mechanical means of transferring freight between cars and boats.

Effect of improvement.—The revetment protects the tracks of the Alabama & Vicksburg Railway from caving into the river. Also fixes the shore line and protects important cotton compresses and warehouse properties; and stabilizes the channel of the river.

Proposed operations.—It is proposed to make necessary repairs to maintain revetment in good condition.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(p) *Reid-Bedford Bend, La.*

Location and description.—Six hundred and three miles below Cairo, right bank. Bank revetment.

Original condition.—Caving has progressed steadily since the surveys of 1879–80, and the bank receded about 1¼ miles between that time and 1906, when the bank had approached so close to the levee as to threaten its existence. The land behind the levee is low and swampy and would have rendered the relocation of the levee expensive and difficult. The bend is also very difficult to revet on account of sloughing banks, where large sections settle slowly and slide out, and deep water and swift current close to the shore.

Previous projects.—None.

Existing project.—To protect the bank, fix the channel in position, and protect the levee by means of continuous revetment along the caving bank in front of the levee.

Operations and results during the present year.—Hydraulic grading for an extension of 3,000 feet was commenced early in September and completed grade for 2,000 feet was made before work was suspended. Work of building channel mats was commenced early in December, but owing to labor shortage and severe freezing winter weather in December and January, a length of only 460 feet containing 1,155 squares was completed, and sunk prior to stopping of work by high stage of river early in February.

The cost of this work amounted to $21,743.38, all of which was for new work. Details of costs and expenditures are given in the following tables; and location of work shown on accompanying plate No. 10.

REID-BEDFORD, LA. (603 R.), THIRD DISTRICT—NEW WORK.

Mattresses, total area 1,155 squares (channel, 100 per cent).

BUILDING WILLOW MATS.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]	....	$1,964.80	....	$1.692
5/16-inch strand [2] ....pounds..	3,139	178.92	2.72	.155
1/2-inch strand [2] ....do....	14,041	954.79	12.16	.827
5/8-inch strand [2] ....do....	12,000	864.00	10.39	.748
5/8-inch clips [2] ....do....	25	2.38	.02	.002
Staples [2] ....number..	348	12.87	.30	.011
Spikes [2] ....do....	300	9.30	.26	.008
Brush and poles [2] ....cords..	2,038	1,100.52	1.76	.953
Coal [3] ....tons..	14.8	73.26	.013	.064
Miscellaneous expenses [4]	....	373.54	....	.323
Subsistence [5]	....	1,607.33	....	1.391
Steamboat expenses [6]	....	375.00	....	.325
Labor [7]	....	2,904.71	....	2.515
Supervision [8]	....	1,189.90	....	1.029
Total	....	11,600.42	....	....

BALLASTING AND SINKING.

Mobilization and demobilization [1]	....	$1,354.80	....	$1.173
Stone [2] ....tons..	956	2,390.00	0.83	2.07
Coal [3] ....do....	19.6	97.02	.02	.084
Miscellaneous expenses [4]	....	250.00	....	.216
Subsistence [5]	....	251.33	....	.217
Steamboat expenses [6]	....	225.00	....	.194
Labor [7]	....	546.54	....	.473
Supervision [8]	....	600.39	....	.520
Total	....	5,715.08	....	....

Grading (2,000 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal [3] ....tons..	117.8	$583.11	0.06	$0.291
Oil [3]	....	46.35	....	.023
Miscellaneous expenses [4]	....	150.00	....	.075
Subsistence [5]	....	791.33	....	.396
Labor [7]	....	1,823.79	....	.912
Supervision [8]	....	400.00	....	.200
Total	....	3,794.58	....	....

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

[5] This item is the cost of the served ration.

[6] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[7] Includes wages of all employed on the work except those specified in 8.

[8] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

REID-BEDFORD, LA. (603 R.), THIRD DISTRICT—NEW WORK—continued.

Summary of costs—Work not completed.

	Subaqueous work.		Upper-bank work.		Grand total.
	Per square.	Total.	Per square.	Total.	
Total field cost	$14.99	$17,315.50	[1] 1.90	$3,794.58	$21,110.08
Office expenses					633.30
Surveys [2]					140.00
Care of plant [3]					547.86
Repair of plant					1,136.08
Depreciation of plant [4]					1,626.94
Total					25,194.21

[1] Grading only.

[2] This item includes actual cost of survey work done on this revetment.

[3] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[4] Depreciation is to be taken at 6 per cent of first cost per annum for all plant with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of year.—Present effective length of revetment is 7,230 feet, all in good condition except several points where sloughs in the upper bank need regrading, and pavement repaired. Work will be resumed as soon as stage of river permits, and the proposed 3,000-foot extension downstream completed. The expenditures on this work to end of present year for new work amount to $417,864.52; for maintenance, $46,428.76; total of $464,293.28.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The work accomplished at this point has fixed the channel in location and protected the bank and an important line of levee, thus obviating the necessity of building a new and costly levee.

Proposed operations.—Such work as may be necessary for maintenance, and an extension downstream of work started last season.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(q) *Red Fork, Ark.*

Location and description.—Arkansas River, 23 miles above mouth. Bank reventment.

Original condition.—A rapidly caving bank threatened the destruction of a levee across the end of Lake Belcoe, the destruction of which would have necessitated building a loop of considerable length.

Previous projects.—None.

Existing project.—Adopted 1907, provides for the protection of levee between Lake Belcoe and river bank by means of bank protection where caving threatens the levee.

Operations and results during the present year.—Work of completing a proposed extension of 4,000 feet at this point was in progress at date of last annual report. Work was continued and completed August 1. A total of 7,574 squares of subaqueous concrete mats were sunk, and 2,087 squares of upper bank paved with concrete. The cost of this work amounts to $37,104.41, all of which is charged to new work. Details of costs and expenditures are given in the following tables, and location of work is shown on accompanying plate No. 11.

RED FORK REVETMENT, ARKANSAS RIVER, THIRD DISTRICT.

Mattresses, total area 2,983 squares.

BUILDING REINFORCED CONCRETE MATS.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]	....	$1,047.18	....	$0.351
Kraft paper [2] ....pounds..	2,771	206.05	0.93	.069
Wire mesh [2] ....squares..	1,389	1,583.46	....	.531
Brush and poles [2] ....cords..	109	167.86	.037	.056
Cement [2] ....sacks..	8,041	3,940.09	2.61	1.321
Sand and gravel [2] ....cubic yards..	3,060	2,325.60	1.03	.779
Coal [3] ....tons..	18.6	92.07	.006	.031
Subsistence [4]	....	936.00	....	.311
Steamboat expenses [5]	....	175.00	....	.057
Labor [6]	....	1,296.53	....	.435
Supervision [7]	....	313.60	....	.105
Total	....	12,084.53	....	....

SINKING CONCRETE MATS.

Mobilization and demobilization [1]	....	$523.59	....	$0.176
[illegible]-inch strand [2] ....pounds..	42,080	3,050.80	14.11	1.023
[illegible]-inch clips [2] ....do....	23,589	1,604.05	7.91	.538
Coal [3] ....tons..	26	128.70	.009	.043
Miscellaneous expenses [8]	....	314.60	....	.105
Subsistence [4]	....	931.23	....	.312
Steamboat expenses [5]	....	125.00	....	.042
Labor [6]	....	1,901.77	....	.638
Supervision [7]	....	156.69	....	.053
Total	....	8,736.53	....	....

Grading (2,119 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Subsistence [4]	....	$830.67	....	$0.392
Labor [6]	....	1,193.58	....	.563
Total	....	2,024.25	....	....

---

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This item is the cost of the served ration.

[5] This item includes all the expenses of operating the tenders, and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.

[6] Includes wages of all employed on the work except those specified in 7.

[7] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

[8] This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment are to be charged to plant.

RED FORK REVETMENT, ARKANSAS RIVER, THIRD DISTRICT—continued.

Concrete paving (2,286 squares).

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization [1]	....	$523.59	....	$0.229
Cement [2] ... sacks	12,286	6,020.14	5.37	2.633
Sand and gravel [2] ... cubic yards	4,371	3,321.96	1.91	1.453
Coal [3] ... tons	43	212.85	.019	.093
Subsistence [4]	....	1,188.67	....	.520
Labor [5]	....	1,794.12	....	.785
Supervision [6]	....	156.69	....	.069
Total	....	13,218.02	....	....

Summary of costs (linear feet reveted, 3,000).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost	$6.90	$20,821.06	$6.67	$15,242.27	$36,063.33	[7] $18.25
Office expenses	....	....	....	....	1,041.05	
Surveys [8]	....	....	....	....	112.00	
Care of plant [9]	....	....	....	....	654.73	3.37
Repair of plant	....	....	....	....	1,357.81	
Depreciation of plant [10]	....	....	....	....	1,945.63	
Total	....	....	....	....	41,174.55	21.62

[1] Includes in each case the cost of assembling and moving plant and material, either from winter quarters or a previous job to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.

[2] The reported cost of the material is the cost delivered on the job.

[3] These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.

[4] This item is the cost of the served ration.

[5] Includes wages of all employed on the work except those specified in 6.

[6] Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.

[7] Based on totals of last year and this and total of 4,200 linear feet revetted.

[8] This item includes actual cost of survey work done on this revetment.

[9] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[10] Depreciation in to be taken at 6 per cent of first cost per annum for all plant with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of year.—Total effective length of revetment is 4,200 linear feet, all in good condition. Caving continues rapid below the revetment, and a further extension of about 1,000 feet downstream should be built in order to effectively protect the controlling levee line.

The expenditures on this work to end of present year for new work amount to $83,505.88, for maintenance $14,728.35, a total of $98,234.23.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The revetment has fixed the channel in location and prevented the Lake Belcoe Levee from being breached by the caving river bank, and thus obviated the necessity of a new and expensive levee.

Proposed operations.—Proposed to make necessary repairs and extensions to maintain work in good condition.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Mississippi River Commission, Third District—Data of cost of revetment, June 1, 1917, to May 31, 1918.

Location.	Expended as per financial statement.	Debits to material on hand.	Credit by material on hand.	Total field cost.	Unit field cost.		Unit overhead cost.	
					Per square.	Per linear foot.	Per square.	Per linear foot.
Ashbrook Neck, Miss.	$107,309.30	....	$40,039.87	$67,269.43	$10.47	$49.86	$1.28	$8.13
Panther Forest, Ark.	50,366.07	....	11,956.72	38,409.35	10.01	....	1.60	....
Greenville, Miss.	76,831.06	$15,725.94	....	92,557.00	15.25	40.56	1.28	12.87
Grand Lake, Ark.	39,603.78	....	25,669.70	13,934.08	11.23	....	1.67	....
Princeton, Miss.	75,974.67	....	45,571.62	30,403.05	9.75	....	1.00	....
Fitler, Miss.	121,692.26	12,488.41	14,052.00	120,128.67	9.61	24.55	1.39	3.59
Cottonwood, Miss.	138,509.65	....	3,365.73	135,143.92	9.57	50.87	.43	7.32
Vicksburg Harbor, Miss.	43,920.15	16,176.30	....	60,096.45	8.29	23.22	.94	3.26
Reid-Bedford, La.	55,057.81	....	33,303.43	21,743.38	18.29	....	2.92	....
Red Fork, Ark.	34,645.45	2,458.96	....	37,104.41	17.13	18.25	.78	3.37

Location.	Work accomplished.		Total cost of work.	Gross unit cost.[1]		Remarks.
	Squares[2]	Linear feet.[3]		Per square.	Per linear foot.	
Ashbrook Neck, Miss.	6,424	1,100	$75,491.15	$11.75	$58.09	Expended for repairs to existing works, $17,402.38.
Panther Forest, Ark.	3,707	....	43,341.97	11.60	....	Repairs for completing last year's extension, $11,277.91.
Greenville, Miss.	6,068	1,070	100,361.53	16.53	53.43	Expended for 1,904 squares of specially constructed pavement, $43,380.13.
Grand Lake, Ark.	1,205	....	16,746.28	13.90	....	Repairs to existing works.
Princeton, Miss.	3,129	....	33,422.21	10.75	....	Work started; no pavement completed.
Fitler, Miss.	12,141	4,750	133,678.58	11.00	28.14	Length reported is for complete repairs and renewals; no new extension.
Cottonwood, Miss.	11,669	2,000	116,383.81	10.00	58.19	
Vicksburg Harbor, Miss.	7,244	2,500	66,209.04	9.14	23.22	
Reid-Bedford, La.	1,155	....	25,194.21	21.81	....	Work started; no pavement completed.
Red Fork, Ark.	5,269	3,000	41,174.55	7.91	21.62	

[1] Includes every item of field and overhead charges.
[2] Square include both subaqueous and upper bank work.
[3] Length of effective revetment gained.

II. LEVEES.

(a) Upper Tensas levee district.

Location.—Extending from the division line between Lincoln and Jefferson Counties on the right bank of the Arkansas River down to and along the right bank of the Mississippi River, to a point opposite Warrenton, Miss., a distance of 289 miles.

Original condition.—By congressional act of September 25, 1850, all Government lands, subject to overflow in Arkansas and Louisiana, were donated to the State authorities to assist in building levees along this front. The first project adopted by the State authorities contemplated the construction of levees, with a crown width equal to their height, a base width equal to seven times their height, and a height such as to be 30 inches above the highest then known water.

With funds obtained from the sale of overflowed public lands donated to the States in 1850, a continuous line of levee was built from the Amos Bayou hills to the lower limits of the district. These levees were practically destroyed in the great flood of 1858, and but little levee work was undertaken between 1858 and 1882.

Previous project.—None.

Existing project.—The present project was adopted by the commission in 1882. It has been modified from time to time, and at present contemplates the enlargement of the existing levee line, in cooperation with State and local levee boards, to a grade 3 feet above the deduced confined highwater of 1912, and a section having an 8-foot crown, a river slope of 3 to 1, a land slope of 3 to 1 from 8 feet below the crown, and thence a banquette, 20 feet wide for levees 10 to 13 feet high, 30 feet wide for levees 13 to 16 feet high, and 40 feet wide for levees higher than 16 feet, with a crown slope of 10 to 1.

Operations and results during the year.—Work was continued until July 15, 1917 on the enlargement, to commission grade and section, of the Arkansas River levee from station 0–149, under oral agreement with John R. Scott at the rate of 14 cents per cubic yard. On account of the low price of work and greatly increased cost of all kinds of supplies and labor, Mr. Scott abandoned the work. During the year under the agreement 19,469 cubic yards were placed at a total cost of $2,750.86.

Proposals were then invited on the remaining uncompleted work in this stretch, about 135,000 cubic yards, but all bids were deemed excessive. On November 21, 1917, an oral agreement was entered into with C. O. Chambless for the construction of the said remaining enlargement at a unit price of 23.8 cents per cubic yard. Under this agreement 53,599 cubic yards have been placed at a total cost of $12,488.57.

On July 16, 1917, a contract was awarded the Hercules Co. (Ltd.), for the construction of the enlargement, to commission grade and section, of the Arkansas River levee from stations 191 to 500, at the rate of 23.3 cents per cubic yard, the total being 1,265,000 cubic yards; this being the uncompleted portion of the work formerly under oral agreement with Reeve H. Hutchinson, at the rate of 12 cents per cubic yard, which he abandoned in March, 1917. During the year the Hercules Co. (Ltd.), placed 109,366 cubic yards of dirt at a total cost of $25,493.93.

Work was continued on the enlargement, to commission grade and section, of the Arkansas River levee, stations 530+15 to 743, under contract with Roach & Stansell. During the year section 1, containing 346,929 cubic yards at a unit price of 17 cents amounting to $58,977.93, was completed. On section 2, 55,781 cubic yards were placed at a total cost of $11,714.01, unit price being 21 cents per cubic yard, completing the enlargement from stations 530+15 to 593.

The proposed enlargement to commission grade and section of the Arkansas River levee from stations 743 to 912 was twice during the year advertised for bids. The lowest bids received, first 48.7 cents per cubic yard, second 53.7 cents per cubic yard, were both rejected, being considered excessive. Plans were then approved to do this work by day labor with levee machines. and an order has been placed with the Bucyrus Co. for delivery by July 1, 1918, of a tower excavator and a small drag line excavator. Work of clearing right of way and the assembly of camp equipment has commenced and 1,000 tons of coal purchased and distributed on the works; the expenditures to date amounting to $7,528.04.

Work was continued and contract completed with N. C. Williamson & Co., for the enlargement, to commission grade and section, of the levee in Louisiana from station 756 + 35 to 930 (530 R.) at the rate of 14.87 cents per cubic yard. During the year 29,885 cubic yards were placed at a total cost of $4,448.90. The contract was completed September 12, 1917, the total yardage being 480,585 cubic yards at a total cost $71,463.01, completing the enlargement from station 756 + 35 to 930.

On September 26, 1917, contract was entered into with Roach, Clerk & Co. for the construction of a new loop at Donna Vista, La., made necessary on account of active caving bank between stations 1099+22 and 1175+22 (535 R.). This work amounted to a total of 397,391 cubic yards at a total cost of $139,086.85, the unit price being 35 cents per cubic yard. The levee was constructed to a grade 2½ feet above the 1916 high water, and a section of 3 to 1 slopes on both sides. Contract completed December 31, 1917.

Levee machine B–7 (Bucyrus drag line) was delivered, erected, and commenced the enlargement of the levee to commission grade and section, at station 1560 (542 R.) in Louisiana on December 23, 1917. Since the work was started, for the most part, weather and river conditions have been unfavorable, and to date 144,149 cubic yards have been placed at a field cost of operation of $29,113.24, being 20.2 cents per cubic yard. The cost of machine and installation amounts to $80,971.66. The machine working up the levee has completed the enlargement to station 1509.

Work was continued and contract completed with Clark, Harris & Dulaney for the construction to commission grade and section of the Hagaman, La.. new levee stations 1559+81 to 1516+46, (542 R.), at the rate of 19 cents per cubic yard. During the year 371,558 cubic yards were placed at a total cost of $70,596.11. The contract was completed April 24, 1918, the total yardage 530,155 cubic yards at a total cost of $100,729.45.

The average price of contract work let during the year was 25.9 cents per cubic yard.

The accompanying profile plate No. 13 shows present grade of the levee line, the proposed commission grade, and the elevation of recent extreme floods.

Total expenditures in this district amounted to $448,899.93.

Conditions at end of the year.—The total length of levee line in this district is 240.5 miles, of which 176.7 miles is along the Mississippi River and 63.8 miles along the Arkansas River, 193.8 miles of levee being built to a provisional grade of 2 feet above the highest flood; 16.1 miles have been completed to full commission grade and section. To complete the entire line to this project grade and section will require the placing of approximately 28,008,310 cubic yards, of which 19,270,438 cubic yards is required in the levee along the Mississippi River and 8,739,872 cubic yards in the levees along the Arkansas River.

The total expenditures in this district, including construction and maintenance, aggregate $8,083,132.68. See statement following paragraphs under lower Yazoo levee district showing conditions at end of the year and total levee yardage (p. 3665).

Local cooperation.—The expenditures by the local levee boards prior to and during the calendar year 1917 are shown in the following table:

Name of levee board.	From 1882 to Dec. 31, 1916.	During calendar year 1917.	Total to Dec. 31, 1917.
Southeast Arkansas levee district, Ark	$1,143,546.82	$110,499.77	$1,254,045.59
State of Louisiana, Tensas Basin levee district and fifth Louisiana levee district, La	7,283,007.35	373,284.24	7,656,291.24
Total	8,426,553.27	483,784.01	8,910,336.83

In addition to the above, the terms of the flood control act (H. R. 14777, 64th Cong.) requiring local interests to contribute "not less than one-half of such sum as may have been allotted by the commission" have been complied with; special contributions covering all allotments by the commission have been made by levee boards as follows:

Southeast Arkansas levee district	$46,666.67
Tensas Basin levee district	92,000.00
Fifth Louisiana levee district	71,334.00

Terminal facilities.—Included in channel work. (See paragraph I (*n*) p. 3654.)

Effect of improvement.—An area of 2,500 square miles has been completely protected from overflow, and 500 square miles additional are protected from all ordinary floods.

Proposed operations.—Completion of all work under contract, and continuation of levee construction and enlargement to commission grade and section in accordance with existing projects and in compliance with provisions of the flood control act.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

(*b*) *Lower Yazoo levee district.*

Location.—Left bank of river from the Coahoma-Bolivar County line, 365 miles below Cairo to mouth of the Yazoo River diversion canal, 599 miles below Cairo.

Original condition.—Prior to 1882 the local levee board had constructed a continuous line of levee along this front from the upper end to Eagle Lake, 24 miles above the mouth of the Yazoo River. The extreme flood of 1882 destroyed many miles of this line.

Existing project.—The same as specified for the upper Tensas levee district. (See II (*a*).)

Operations and results during the present year.—Work on the enlargement of the levee from station 0 to station 520 was continued by day labor with the Government levee machine C-1. On account of the long haul and unfavorable pit conditions, progress was slow. During the year 45,755 cubic yards were placed at a field cost of $19,102.25 (41.8 cents per cubic yard), which completed the levee to commission grade and section, to station 143.

Project for enlargement to commission grade and section of the levee from stations 500 to 900 (374–380 L.) by day labor with levee machines was approved. A tower excavator and a small drag-line excavator have been ordered from the Bucyrus Co. to be delivered by August 1, 1918; and camp equipment is being assembled, the expenditure to date being $1,494.40.

On September 26, 1917, contract was awarded George F. Ramsey for the construction of the enlargement, to commission grade and section, of the levee along the Rosedale, Miss., front, stations 1200 to 1513 (395 L.); the contract amounting to 500,000 cubic yards at a unit cost of 32.9 cents per cubic yard, to be completed December 31, 1918. To date the contractor has placed 203,456 cubic yards, at a total cost of $66,937.02, completing 73,000 feet of the enlargement.

On December 10, 1917, contract was awarded the firm of Roach, Stansell, Lowrance Bros. & Co., for the construction of the enlargement, to commission grade and section, of Riverton Levee, stations 1513 to 1575+46 (398 L.); the contract amounting to 160,000 cubic yards at a unit cost of 32.8 cents per cubic yard, to be completed December 31, 1918. No work except drainage has been done on account of unfavorable river conditions.

Work was continued and contract completed with Walter H. Denison for the enlargement to commission grade and section of the levee from station 1850 to 2050 (402 L.), at 14.37 cents per cubic yard. During the year 66,557 cubic yards were placed at a cost of $9,564.24. The contract was completed March 12, 1918; the total yardage being 748,615 cubic yards at a total cost of $107,575.99, completing the enlargement from stations 1850 to 2050.

Between stations 1850+50 and 1855 (402 L.), across Willow Slough, a slide occurred on the river side of the levee. To remedy this a riverside blanket was built by day labor, a total amount of 14,746 cubic yards of dirt being placed at a total cost of $8,555.

No work was done on the enlargement of the Lake Beulah Crevasse Levee, stations 2050–2130 (404 L.), under contract with R. T. Clark & Co. On account of the scarcity of forces the above firm was permitted to contract for a portion of an emergency loop in Louisiana, after completion of which conditions were so that they could not operate on the Beulah contract.

In October, 1917, work was commenced by day labor, grading for the city landing at Greenville, Miss., and enlarging to commission grade and section, the levee stations 4251+50 to 4265+45 (478 L.). This work was completed in February, 1918, there having been placed 34,686 cubic yards of material at a total cost of $24,053.05.

Work was continued until September 30, 1917, on the enlargement of the levee, stations 1167–1567+33 (495–502 L.) below Greenville, under contract with Bondurant, Callahan, Cheshire & Co. During that period 52,099 cubic yards were placed at a total cost of $7,471. The unit price of work under this contract was 14.34 cents per cubic yard. After September 30, 1917, on account of financial differences between the subcontractor owning the levee machine and the contractor, the work was abandoned, leaving about 600 feet of levee just ahead of the completed work cut down to banquette grade, after repeated efforts to induce the contractors to resume work. A force account agreement was arranged with H. B. Blanks, who had purchased the cableway excavator, to resume the operation of the machine and complete the levee along the reach cut down, at a unit cost of 30 cents per cubic yard. Twenty-two thousand four hundred and thirty-two cubic yards were placed under this agreement, completing the enlargement along the low levee at a total cost of $6,729.60. This contract was annulled May 2, 1918, and the yardage remaining to be placed, amounting to 460,000 cubic yards, was readvertised; bids opened May 20, 1918; and work relet to H. B. Blanks at a unit cost of 39.5 cents per cubic yard.

On November 30, 1917, contract was awarded H. B. Blanks for the enlargement to commission grade and section of the Worthington Point Levee, stations 1700 to 1800 (509 L.), below Greenville; the contract amounting to 250,000 cubic yards, at a unit cost of 29 cents per cubic yard, to be completed December 31, 1918. To date the contractor has placed 132,138 cubic yards at a cost of $38,320.02, completing the enlargement between stations 1760 and 1800.

Work was continued and contract completed by the H. B. Blanks Levee Co. for the enlargement, to commission grade and section of the levee from station 1800 to 2100 (509–514 L.), below Greenville, at 12.24 cents per cubic yard. During the year 144,571 cubic yards were placed at a total cost of $17,695.49. The contract was completed March 23, 1918, the total yardage being 732,918 cubic yards at a total cost of $89,709.17, completing the enlargement from station 1800 to 2100.

On October 2, 1917, contract was entered into with the firm of W. T. & E. M. Lowrance & Co. for enlarging to a grade of 2 feet above the 1916 high water certain stretches of levee of deficient height and section, near the lower end of this district. Below is a table showing the location, amount, cost, and per cent completed of this work.

Name of levee.	R. D.	Section.	Stations.	Total yardage.	Cubic yards in place.	Unit price.	Total cost.
						Cents.	
Ellesley and Shipland	542 L.	1	3302–3355	46,244	[1] 46,244	28	$12,948.32
	542 L.		3450–3491	27,875	[1] 27,875	28	7,806.40
Tallula	550 L.	1	3700–3817	87,867	[1] 87,867	28	24,602.76
		2	3817–3910	89,209	[1] 89,207	45	40,143.15
Tennessee	562 L.	1	4418+55–4577+20	114,765	[1] 114,765	28	32,134.20
		2	4577+20–4614+71	129,979	93,130	26	24,213.80
		3	4614+71–4732+33	94,207	[1] 94,207	25	23,551.75

[1] Contract completed.

The average price of contract work during the present year was 0.318 cent per cubic yard.

The total expenditures in this district during the year amounted to $371,064.50.

Condition at the end of the year.—The length of the levee line is 185.2 miles, 164.2 miles have been built to a provisional grade of 2 feet above the highest flood, and 21 miles have been completed to full commission grade and section. To bring the entire line up to this grade and section will require approximately 32,099,462 cubic yards. The accompanying profile Plate No. 14 shows the present grade of the levee line, the proposed commission grade, and the elevations of recent extreme floods.

The total expenditures in this district, including construction and maintenance, aggregate $7,108,428.33.

See table below giving total levee yardage:

Data concerning levee yardage in the third Mississippi River district.

Levee district.	In system.	Built.	Contents, 1917.	Built since by—		Total built since 1917.
				United States.	Local authorities.	
	Miles.	*Miles.*	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*
Lower Yazoo	206.8	185.2	53,271,514	[1] 1,269,742	[2] 584,059	1,853,801
Upper Tensas	[3] 241.0	191.3	54,062,474	1,387,144	772,235	2,159,379

Levee district.	Lost or abandoned during year.	Contents, 1918.	Required to complete.	Estimated final contents.	Per cent now built.	Approximate area protected.
	Cubic yards.	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*		*Square miles.*
Lower Yazoo	180,000	54,945,315	32,099,462	87,044,777	63.1	3,367
Upper Tensas	[3] 865,000	55,356,853	28,008,310	83,365,163	66.4	2,675

[1] 537,276 cubic yards, Ashbrook Dike not included.
[2] 3,315 cubic yards in sublevees not included.
[3] Includes the extension of the district to the Lincoln-Jefferson County line on Arkansas River.

Cost of levees in third district built by machines.

Machine and location.	Mobilization.	Clearing.	Drainage.	Plowing.	Operation.	Repairs.	Dressing.
Levee machine C-1; lower Yazoo levee district	$2,750.00	$699.71	$553.84	$85.58	$3,570.37	$1,081.37	$338.60
Levee machines B-4 and B-5; Ashbrook Dike	3,290.00	27,658.99	358.06	13.69	37,431.32	4,443.51	2,721.17
Levee machine B-7, upper Tensas levee district in Louisiana	1,930.00	906.89	1,062.54	83.30	12,686.06	3,227.05	1,605.23
Levee machine C-2; upper Tensas levee district (Arkansas River)	319.52	1,341.40			5,867.12		
Levee machine C-3; lower Yazoo levee district	1,494.40						

Machine and location.	Sodding.	Care.	Depreciation.[1]	Overhead.	Total cost.	Handled.	Cost per yard.
						Yards.	*Cents.*
Levee machine C-1; lower Yazoo levee district	$181.82	$5,280.96	$4,560.00	$3,000.40	$22,102.65	45,755	48.50
Levee machines B-4 and B-5; Ashbrook Dike	60.47	4,805.64	16,517.20	8,682.66	107,338.02	537,276	19.95
Levee machine B-7; upper Tensas levee district in Louisiana	445.44	4,827.93	8,097.17	3,137.11	38,008.72	144,149	26.36
Levee machine C-2; upper Tensas levee district (Arkansas River)					[2] 7,528.04		
Levee machine C-3; lower Yazoo levee district					[2] 1,494.40		

[1] Depreciation of plant is fixed at 20 per cent per annum.

[2] Machines not delivered. Work shown is assembling of camp equipment, purchase and distribution of material and supplies.

Local cooperation.—The expenditures by the only local levee board interested in the maintenance of this levee line are shown by the following statement:

Name: Board of Mississippi Levee Commissioners.

Expended from 1882 to Dec. 31, 1916	$15,242,761.21
Expended during calendar year 1917	446,297.12
Total to Dec. 31, 1917	15,689,058.33

In addition to the above, the terms of the flood-control act (H. R. 14777, 64th Cong.) requiring local interests to contribute "not less than one-half of such sum as may have been allotted by the commission," have been complied with; the Board of Mississippi Levee Commissioners making special contributions to apply as above amounting to $270,001.

Terminal facilities.—Included in channel works. (See paragraphs I (*e*) and I (*o*).)

Effect of the improvement.—An area of 3,367 square miles has been protected from overflow.

Proposed operations.—Completion of all work under contract, and continuation of levee construction and enlargement to commission grade and section, in accordance with existing projects and in compliance with provisions of the flood-control act.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

III. SURVEYS.

(*a*) *Revetment surveys.*

Hydrographic surveys were made over all revetments, between July 12 and September 11, 1917. The information obtained from these surveys is incorporated in the several paragraphs relating to condition of revetments.

In these surveys the original base lines, run out in order to accurately locate the mats placed, and certain fixed ranges, usually 200 feet apart, were retraced; soundings were taken on the ranges thus located; shore lines were run above and below the revetments as far as active caving was encountered, and soundings were taken on ranges 1,000 to 1,500 feet apart within these reaches.

(*b*) *Reach and bank line surveys.*

Surveys were also made in the following reaches: Dennis (372 L.); Waxhaw (393 L.); Riverton (400 L.); Caulks Neck (409 R.); Nibletts, Miss. (410L.); Chicot, Ark. (430 R.); Arkansas City (439 R.); Millers Bend (459 L.); Lake Jackson (511 L.); Valewood, Miss. (528 L.); Stack Island Chute (540 L.); Donna Vista, La. (534 R.); Cottonwood (558 L.); Brunswick (573 L.); Henderson (573 R.); Millikens Bend (583 R.), and Duckport, La. (590 R.).

These surveys indicate that caving is in progress in all reaches surveyed, and that new levee loops or revetments will be necessary in the immediate or near future at the following points:

Riverton, Miss. (400 L.).
Valewood, Miss. (528 L.).
Brunswick, Miss. (574 L.).
Henderson, La. (573 R.).
Millikens Bend, La. (583 R., 585 R.).

In these surveys the bank line was meandered, and where necessary soundings were taken on ranges 1,000 to 1,500 feet apart, and preliminary lines run for proposed new levees.

The field cost of these surveys amounted to $3,624.20.

In addition to the above surveys a special survey was made by direction of the Mississippi River Commission to investigate all gravel deposits in the district. The following points were investigated:

Sibley Chute (391 R.)
Catfish Towhead (421 L.)
Island No. 78 (435 R.)
Island No. 81 (444 R.)
Island No. 82 (451 R.)
Greenville, Miss. (478 L.)

A report was made to the commission March 7, 1918 giving results of survey in full.

IV. PLANT.

The following items of plant were added during the year:

The steam tug *Parker* previously condemned was rebuilt new. Work on 12 new creosoted barges was completed and six additional creosoted barges authorized and work on same commenced. Steam concrete mat-laying boat *No. 1713*, concrete tower barge *No. 1712*, and concrete mixing plants *Nos. 1709* and *1711* were built; and work completed on grader *No. 1014*, and the new machine shop; all of the above work being performed by hired labor at the repair fleet and boat yard at Vicksburg, Miss.

The following table shows the cost of new plant built or purchased during the year, June 1, 1917 to May 31, 1918:

Name or number.	Cost.	How obtained.
Tug Parker	$11,577.14	Built by hired labor at United States boat yard.
Launch Portia	3,166.93	Purchased from private parties; minor repairs made by hired labor at United States boat yard.
12 new barges	9,207.68	Built by hired labor at United States boat yard. Completed.
6 new barges	26,532.21	Built by hired labor at United States boat yard. Not completed.
Sand and gravel dredge No. 1312	8,243.29	Purchased from private parties and overhauled by hired labor at United States boat yard.
Mat boat No. 1713	29,279.02	Built by hired labor at United States boat yard.
Grader No. 1014	2,648.39	Built by hired labor at United States boat yard Completed.
New machine shop	3,515.94	Do.
Tower barge 1712	11,224.01	Built by hired labor at United States boat yard.
Line barge 1714	1,154.84	Do.
Concrete mixer 1709	1,081.52	Do.
Concrete mixer 1711	4,859.95	Do.
Calking flat No. 7	128.52	Do.
Calking flat No. 8	128.80	Do.
Auto truck	794.89	Purchased from Powell Motor Co., tools, etc., made by hired labor at United States boat yard.
Skiffs (20)	924.43	Built by hired labor at United States boat yard.
Total	114,487.56	

General repairs were made to plant during the year, and plant was cared for during the lay-up season.

The following table shows the cost of repair work done on plant during the year, June 1, 1917, to May 31, 1918:

Name or number.	Cost.	Work done.
Steamers:		
Control	$2,213.75	Docking, repairing hull, new cylinder timbers, calking, building lockers, work on wheel, cabin, general repairs to machinery, work on windows, guards, deck, cams, pipes, and boilers.
H. St. L. Coppee	2,103.04	Repairing valves, machinery, boilers, work on windows, doors, rudder, painting, making flanges, etc. Docked and repaired hull.
Arthur Hider	1,806.44	Work on pipes, fenders, repairing lubricators; installing new boilers.
Issaquena	2,302.52	Building screen doors, repairing main chains, doctor, work on exhaust pipe, machinery, painting, etc. Docking.
Tugs:		
White Water	1,143.20	Docking, putting sleeve on plunger, repairing oil pump, making new hatch covers, work on valves, windows, doors, overhauling machinery, etc.
Boaz	578.19	Repairing nosing, work on deck, crank pin, ash buckets, testing boilers, work on cabin, etc.
Sydney C	974.61	Making britchen, repairs to pipe, boilers, heater, pumps, and engine.
Launches:		
Carroll	85.77	Repairing rudder, shaft, making bearings, etc.
Chicot	581.36	Docking, welding shaft, fitting up cylinders, repairs to hull, engine, generator, etc.
Gas boats:		
No. 2	22.59	General repairs (minor).
No. 3	30.98	Repairs to engine, etc.
Graders:		
No. 1011	221.58	Grinding valves, work on lubricator, pipes, overhauling screens, making stands, etc.
No. 1012	776.45	Making bolts, threading pipes, work on doors, clamps, bushings, repairs to main pump, grinding valves, building lockers, work on condenser, ash chute, capstan, injector, etc.
No. 1013	280.09	Making nozzle tips, work on cabin, pumps, boilers, screen doors, etc.
Derricks:		
No. 1711	943.20	Building roof, calking, piping, making patterns, work on machinery, repairs to furnace. etc.
No. 071	171.80	Repairing boom, making patterns, overhauling doors, windows, cabin, etc.
No. 1109	904.32	Putting in timber heads, repairing cabin, work on deck, and boom, repairs to engine, brake bands, etc.
No. 1311	371.09	Calking sides, repairing deck, docking, testing boilers, etc.
No. 1503	426.25	Repairing boom, sheaves, making bushings, pins, repairing engine, etc.
No. 1504	454.13	Repairing derrick boom, work on pump, deck, sheaves, boilers, brake bands, calking, etc.
No. 1509	171.34	Making patterns, testing boilers, repairing engine-work on capstan, siphon, etc.
Concrete mixing plant, No. 1511	1,301.43	Transferring machinery from concrete mixing plant No. 072; enlarging cement bins, etc.
Quarter boats:		
No. 31	78.90	Repairing screens, ice boxes, windows, handling lumber, painting, etc.
No. 155	128.37	Docking, calking, spiking, putting plank in rake, painting, etc.
No. 156	115.64	Calking sides, building stage plank, work on cabin, etc.
No. 157	43.65	Handling lumber, etc.
No. 159	480.18	Repairing pipes, screen doors, cabin, painting, etc.
No. 1010	47.66	Repairs to stovepipe, work on ice boxes, etc.
No. 1108	128.35	Handling material and work on fenders.
No. 1202	29.62	Making stovepipes, etc.
No. 1307	518.59	Work on doors, deck, repairing roof, pipes, boilers, ice boxes, etc.
No. 1513	51.97	Repairing cabin, installing electric plant, etc.
No. 1308	148.65	Building screen doors, repairing windows, roof, cabin, making desk, etc.
No. 1607	15.62	Repairing screens, etc.
Mat boat: No. 1608	2,747.92	Repairing angles, skids, capstan, engine, calking sides, building track, repairing pumps, work on brake bands, etc.

Name or number.	Cost.	Work done.
Barges:		
No. 073	$314.68	Repairing deck, putting in timber heads, calking, bolting, etc.
No. 074	120.50	Work on timber heads, rake, calking, painting, etc.
No. 086 (supply)	844.71	Calking sides, rakes, repairing deck, building supply house.
No. 103	2,447.03	Docking work on rake, building platform, painting, building stage, etc. Made into tipple barge.
No. 104	64.36	Calking.
No. 572	120.14	Docking, repairing, calking, putting plank in bottom, etc.
No. 579	27.80	Repairing, calking, etc.
No. 580	317.14	Docking, calking, painting seams, etc.
No. 582	213.58	Putting in timber heads, docking, calking, bolting, etc.
No. 585	101.18	Docking, planking sides, calking, painting seams, etc.
No. 587	3.25	Putting in timber heads.
No. 1106	170.84	Docking, calking, planking, etc.
No. 1102	65.60	Patching deck, calking sides, etc.
No. 1108	117.70	Calking, spinning oakum, work on bottom, etc.
No. 1203 (steel)	125.31	Building sides on barge.
No. 1205 (steel)	222.71	Putting up sides and painting.
No. 1304	68.80	Docking, handling material, painting, etc.
No. 1405	214.02	Docking, spinning oakum, calking bottom and sides, etc.
No. 1509 (tower)	315.02	Overhauling, work on pipe, etc.
No. 1601	85.37	Docking, painting, scraping hull, etc.
No. 1512	19.01	Repairing floor, calking, etc.
No. 1206 (gravel)	131.51	Repairing bins, painting hull, etc.
No. 1606	82.25	Scraping, painting, etc.
No. 1105	91.22	Docking, calking sides, etc.
No. 1102	213.65	Docking, overhauling, calking, etc.
No. 1605 (steel)	42.70	Painting, etc.
No. 1302 (steel)	75.30	Painting and scraping.
No. 1208	61.50	Docking, painting hull, taking off dock, etc.
Old machine shop, No. 222	177.64	Repairing machinery, etc.
Repairing wagons	403.40	Making U bolts, plates, and general overhauling.
Dry dock, No. 1015	871.73	Putting down new sills, grinding valves, and work on pipes.
Total	30,528.90	

Summary of plant expenditures.

New plant	$114,467.56
Repairs to plant	30,528.90
Care of plant	14,847.63
Total	159,844.09

The following inclosures accompany this report to which reference has been made:

Plate No. 1. District map.
Plate No. 2. Red Fork revetment.
Plate No. 3. Ashbrook Neck revetment.
Plate No. 4. Panther Forest revetment.
Plate No. 5. Greenville revetment.
Plate No. 6. Grand Lake revetment.
Plate No. 7. Princeton revetment.
Plate No. 8. Fitlers revetment.
Plate No. 9. Cottonwood revetment.
Plate No. 10. Vicksburg revetment.
Plate No. 11. Reid-Bedford revetment.
Plate No. 12. Lower Yazoo levees.
Plate No. 13. Upper Tensas levees.

A. M. Todd,
Assistant Engineer in Charge.

ABSTRACT OF CONTRACTS IN FORCE, THIRD MISSISSIPPI RIVER DISTRICT, FOR FISCAL YEAR ENDED JUNE 30, 1918.

Levee work in upper Tensas levee district.

ABOVE GREENVILLE, MISS.

Name of contractor: Geo. F. Ramsey.
Amount and character of work: Enlarging levee on Rosedale front to Mississippi River Commission grade and section, stations 1200 to 1513 (395 L.), involving about 500,000 cubic yards of earthwork embankment.
Unit price: 32.9 cents per cubic yard.
Date of contract: September 26, 1917.
Date of approval: October 2, 1917.
Date work begun: October 16, 1917.
Time limit: December 31, 1918.
Completed: Section 1: 1200–1396, 45 per cent; section 2: 1396–1513, 46 per cent.

Name of contractor: Roach, Stansell, Lowrance Bros. & Co.
Amount and character of work: Enlarging Riverton levee to Mississippi River Commission grade and section, stations 1513 to 1575+46 (398 L.), involving about 160,000 cubic yards of earthwork embankment.
Unit price: 32.8 cents per cubic yard.
Date of contract: December 10, 1917.
Date of approval: December 22, 1917.
Date work begun: January 10, 1918.
Time limit: December 31, 1918.
No work possible on account pits flooded.

Name of contractor: R. T. Clark & Co.
Amount and character of work: Enlarging Beulah Crevasse Levee to Mississippi River Commission grade and section, stations 2090 to 2130 (404 L.), involving about 319,116 cubic yards of earthwork embankment.
Unit price: 21.8 cents per cubic yard.
Date of contract: November 13, 1914.
Date of approval: November 27, 1914.
Date work begun: December 17, 1914.
Time limit: December 1, 1916. (Time limit waived Nov. 2, 1915, E. D. 95947/16.)
Completed: 73 per cent.

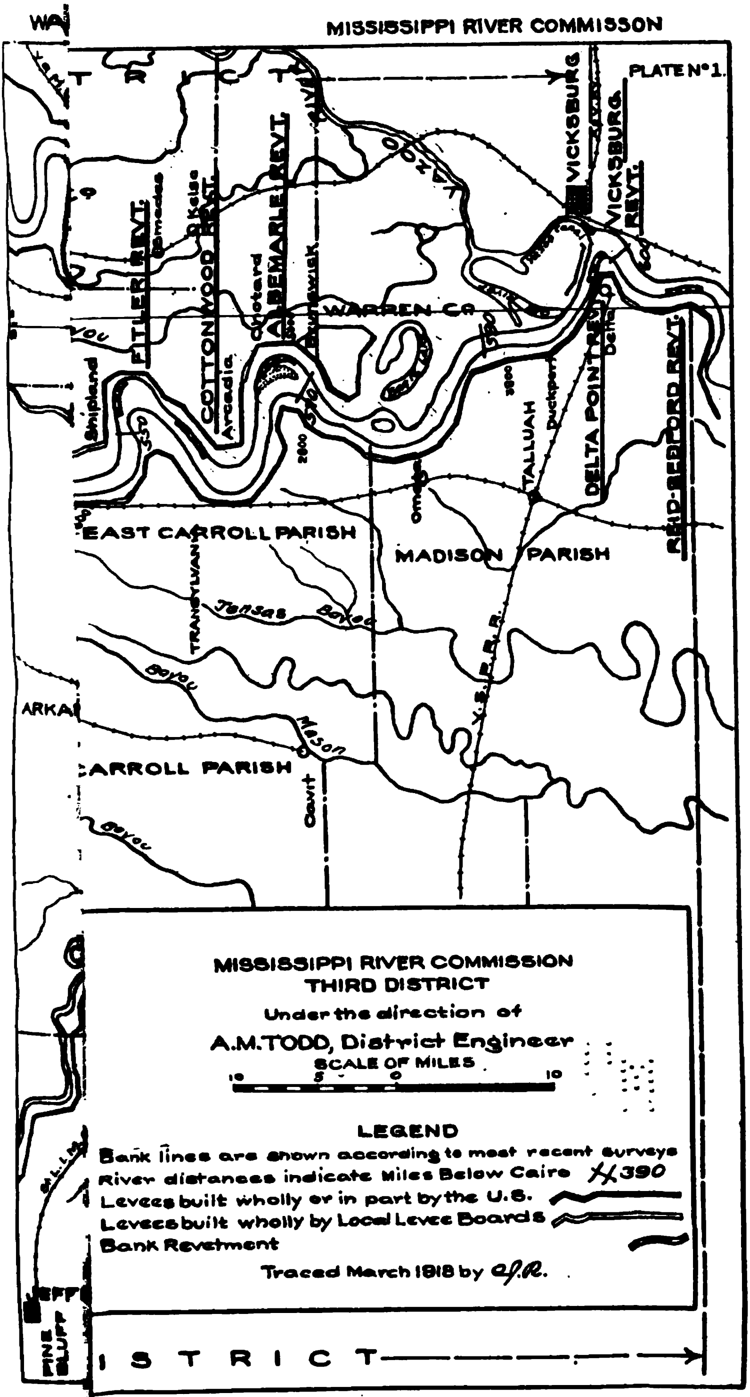
BELOW GREENVILLE, MISS.

Name of contractor: H. B. Blanks.
Amount and character of work: Enlarging levees from Wayside to Stella, Miss., to Mississippi River Commission grade and section, stations 1167 to 1567+33 (495–502 L.), involving about 460,000 cubic yards of earthwork embankment.
Unit price: 39.5 cents per cubic yard.
Date of contract: June 1, 1918.
Date of approval: June 6, 1918.
Date work begun: June 21, 1918.
Time limit: December 31, 1918.
Preliminary work only—no dirt moved.

Name of contractor: H. B. Blanks.
Amount and character of work: Enlarging Worthington Point Levee to Mississippi River Commission grade and section, stations 1700 to 1800 (505 L.), involving about 250,000 cubic yards of earthwork embankment.
Unit price: 29 cents per cubic yard.
Date of contract: November 30, 1917.
Date of approval: December 5, 1917.
Date work begun: December 23, 1917.
Time limit: December 31, 1917.
Completed: 80 per cent.

MISSISSIPPI RIVER COMMISSON

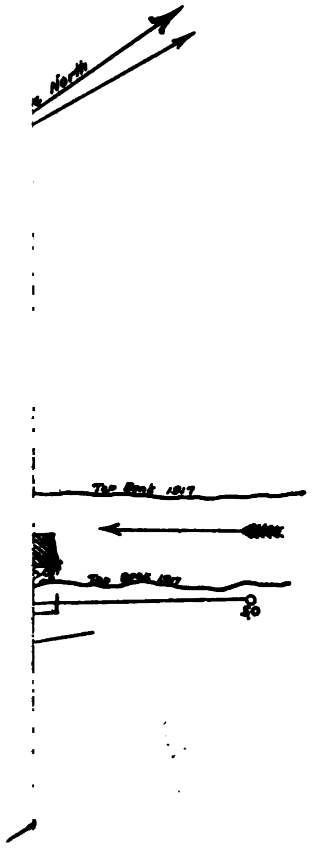
PLATE N°1.



WAR

MISSISSIPPI RIVER COMMISSION

PLATE No. 10



MISSISSIPPI RIVER COMMISSION
Third District
VICKSBURG REVETMENT
MOUTH OF YAZOO CANAL
Prepared under the direction of
A.M.TODD District Engineer
SCALE OF FEET
Horizontal
1000 500 0 1000 2000

Soundings reduced to 5' on Vicksburg Gage
Survey of Sept 1917 Chief of Party
Traced May 1918 by

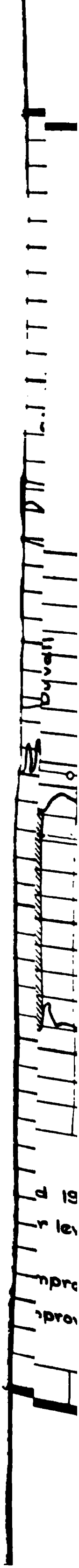
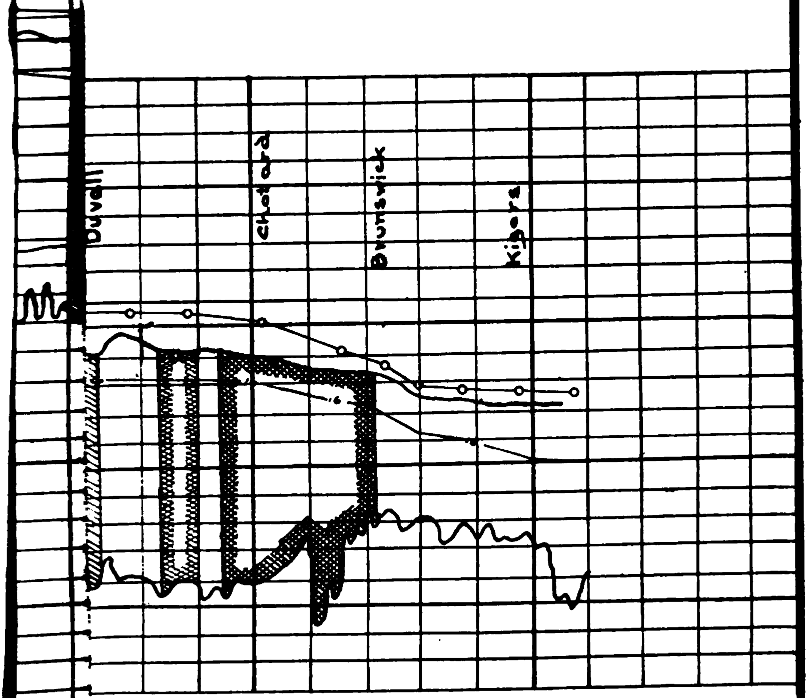

Duvall
d 19
r lev
mpro
mprov

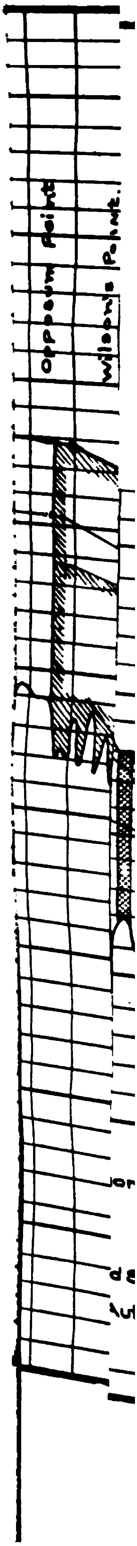
PLATE Nº 12

MISSISSIPPI RIVER COMMISSION
Third District
LOWER YAZOO LEVEES
Prepared under the direction of
A.M.TODD District Engineer
E.C.Tollinger Asst. Engr.
Traced by T.B.L. May 1918



d 1914 Commission Grade	—o——o—
r level of 1916.	-16——16—
mproved by United States 1917-1918	▨
nproved by State Authorities 1917-1918	■

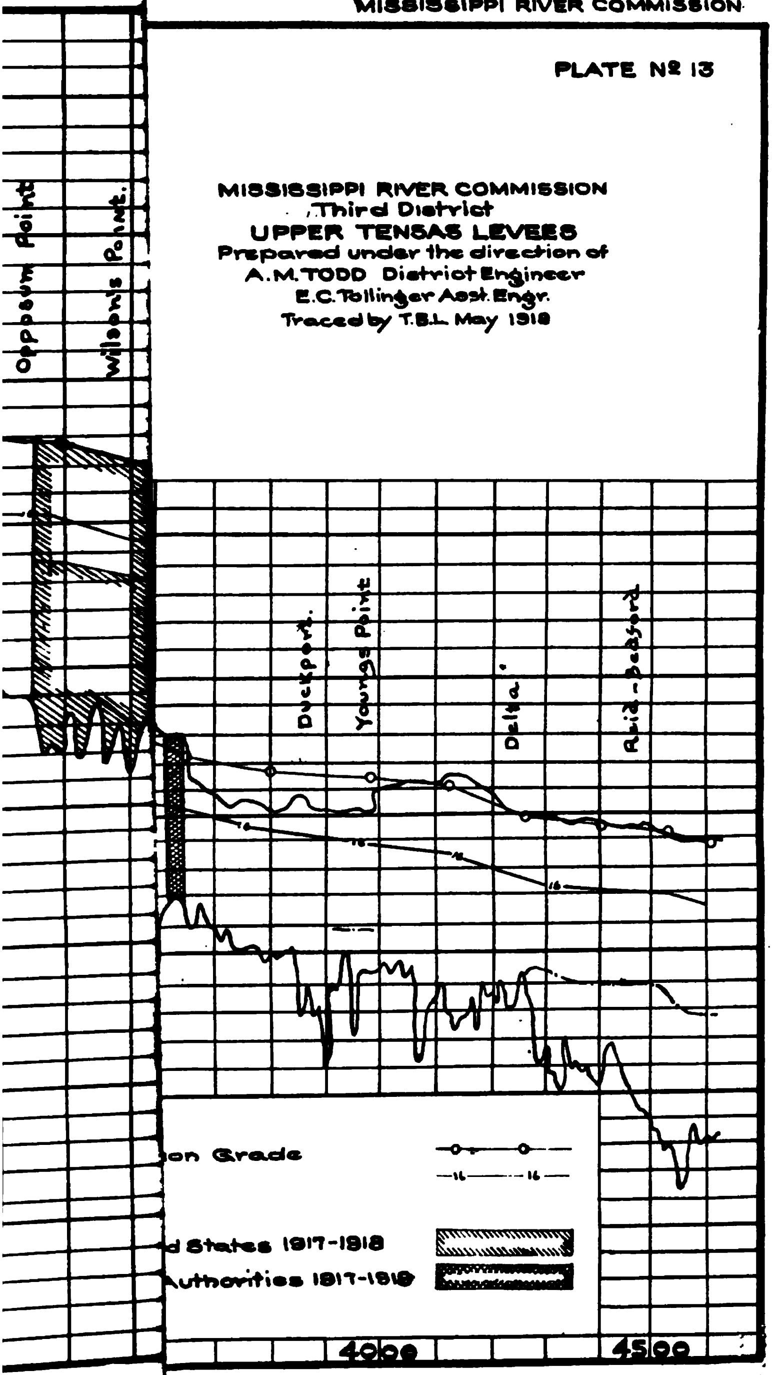
5000 5500


Opossum Point
Wilson's Point.

MISSISSIPPI RIVER COMMISSION

PLATE Nº 13

MISSISSIPPI RIVER COMMISSION
Third District
UPPER TENSAS LEVEES
Prepared under the direction of
A.M.TODD District Engineer
E.C.Tollinger Asst. Engr.
Traced by T.B.L. May 1918



LEVEE WORK IN UPPER TENSAS LEVEE DISTRICT IN ARKANSAS.

Name of contractor: Hercules Co., (Ltd.).
Amount and character of work: Enlarging levees on Arkansas River to Mississippi River Commission grade and section, stations 191 to 500, involving about 1,265,000 cubic yards of earthwork embankment.
Unit price: 23.3 cents per cubic yard.
Date of contract: July 16, 1917.
Date of approval: August 1, 1917.
Date work begun: August 17, 1917.
Time limit: December 31, 1918.
Completed: 13 per cent.

Name of contractor: Roach, Stansell & Co.
Amount and character of work: Enlarging levees on Arkansas River to Mississippi River Commission grade and section, stations 530+15 to 743, involving about 680,000 cubic yards of earthwork embankment.
Unit price: 23.75 cents per cubic yard.
Date of contract: October 6, 1916.
Date of approval: October 18, 1916.
Date work begun: November 3, 1916.
Time limit: December 1, 1919.
Completed: 63 per cent.

MISCELLANEOUS CONTRACTS.

Name of contractor: Tennessee Contracting Co.
Character of contract: Permission to cut willows from all lands owned or controlled by the contractor.
Price: 10 cents per cord for all willows cut by the United States.
Date of contract: January 15, 1915.
Date of approval: January 13, 1915.
Date work begun: May 10, 1915.
Date of expiration and percentage completed can not be stated, as they depend on expiration of options controlled by the contractor and quantities of brush that may be cut by the United States in the meantime.

Name of contractor: Yazoo & Mississippi Valley Railroad Co.
Character: Lease of strip of land bordering third Mississippi River district repair yard, including use of side track, for a period of five years from October 10, 1914, to October 9, 1919, inclusive.
Rent price: $374 for first year and $24 for each subsequent year.
Date of lease: November 2, 1914. (Not subject to approval.)

FINANCIAL STATEMENT—THIRD DISTRICT.

Appropriation for maintenance and improvement of existing river and harbor works, act Oct. 2, 1914.

UPPER TENSAS LEVEE DISTRICT.

July 1, 1917, balance unexpended	$180, 018. 45
June 30, 1918, expended during fiscal year	43, 560. 27
July 1, 1918, balance unexpended	136, 458. 18
July 1, 1918, amount covered by uncompleted contracts	136, 458. 18

LOWER YAZOO LEVEE DISTRICT.

July 1, 1917, balance unexpended	111, 447. 62
June 30, 1918, expended during fiscal year	36, 092. 46
July 1, 1918, balance unexpended	75, 355. 16
July 1, 1918, amount covered by uncompleted contracts	75, 355. 16

Appropriation for maintenance and improvement of existing river and harbor works, act Mar. 4, 1915.

UPPER TENSAS LEVEE DISTRICT.

July 1, 1917, balance unexpended	$34,501.59
June 30, 1918, expended during fiscal year	34,501.59

LOWER YAZOO LEVEE DISTRICT.

July 1, 1917, balance unexpended	7,620.51
June 30, 1918, expended during fiscal year	7,620.51

SURVEYS, THIRD DISTRICT.

July 1, 1917, balance unexpended	2,548.92
June 30, 1918, expended during fiscal year	2,548.92

ASHBROOK NECK, MISS.

July 1, 1917, balance unexpended	26,774.83
June 30, 1918, expended during fiscal year	26,774.83

Appropriation for Mississippi River, river and harbor act July 27, 1916.

UPPER TENSAS LEVEE DISTRICT.

July 1, 1917, balance unexpended		$303,449.05
Overpayments in fiscal year 1917 collected		5.00
		303,454.05
June 30, 1918, expended during fiscal year		172,886.64
July 1, 1918, balance unexpended		130,567.41
July 1, 1918, outstanding liabilities	$3,460.27	
July 1, 1918, amount covered by uncompleted contracts	114,017.26	
		117,477.53
July 1, 1918, balance available		13,089.88

LOWER YAZOO LEVEE DISTRICT.

July 1, 1917, balance unexpended		104,620.02
Reimbursable accounts settled		14.00
Overpayments in fiscal year 1917 collected		362.83
		104,996.85
June 30, 1918, expended during fiscal year	$40,472.43	
Transferred to Ashbrook Dike, Miss	30,000.00	
Transferred to Plant, third district	20,000.00	
		90,472.43
July 1, 1918, balance unexpended		14,524.42
July 1, 1918, amount covered by uncompleted contracts		14,524.42

SURVEYS, THIRD DISTRICT.

July 1, 1917, balance unexpended	5,000.00
June 30, 1918, expended during fiscal year	5,000.00

LAKE BOLIVAR FRONT, MISS.

July 1, 1917, balance unexpended	8,862.45
July 1, 1918, balance unexpended	8,862.45
July 1, 1918, outstanding liabilities	2,047.82
July 1, 1918, balance available	1,814.63

ASHBROOK NECK, MISS.

July 1, 1917, balance unexpended	$38, 345. 62
Reimbursable accounts settled	248. 60
	38, 594. 22
June 30, 1918, expended during fiscal year	38, 594. 22

ASHBROOK DIKE, MISS.

July 1, 1917, balance unexpended	114, 326. 87
Transferred from lower Yazoo levee district	30, 000. 00
	144, 326. 87
June 30, 1918, expended during fiscal year	132, 152. 05
July 1, 1918, balance unexpended	12, 174. 82
July 1, 1918, outstanding liabilities	4, 343. 53
July 1, 1918, balance available	7, 831. 29

PANTHER FOREST, ARK.

July 1, 1917, balance unexpended	26, 623. 94
June 30, 1918, expended during fiscal year	26, 623. 94

FITLERS BEND, MISS.

July 1, 1917, balance unexpended	192. 26
June 30, 1918, expended during fiscal year	192. 26

COTTONWOOD, MISS.

July 1, 1917, balance unexpended	5, 633. 72
Overpayments in fiscal year 1917 collected	. 11
	5, 633. 83
June 30, 1918, expended during fiscal year	5, 633. 83

VICKSBURG, MISS.

July 1, 1917, balance unexpended	30, 040. 64
Reimbursable accounts settled	37. 00
	30, 077. 64
June 30, 1918, expended during fiscal year	30, 077. 64

REID-BEDFORD BEND, LA.

July 1, 1917, balance unexpended		73, 520. 39
Reimbursable accounts settled		65. 56
		73, 585. 95
June 30, 1918, expended during fiscal year	$43, 585. 95	
Transferred to plant, third district	30, 000. 00	
		73, 585. 95

RED FORK, ARK.

July 1, 1917, balance unexpended	12, 023. 07
Overpayments in fiscal year 1917 collected	3. 00
	12, 026. 07
June 20, 1918, expended during fiscal year	12, 026. 07

REPAIRS TO EXISTING WORKS AND STONE.

July 1, 1917, balance unexpended	$45,966.17
Reimbursable accounts settled	35.00
	46,001.17
June 30, 1918, expended during fiscal year	46,001.17

PLANT, THIRD DISTRICT.

July 1, 1917, balance unexpended	74,828.85
Transferred from lower Yazoo levee district	20,000.00
Transferred from Reid-Bedford Bend, La.	30,000.00
Receipts from sales	2,674.15
Receipts from rent of plant	6,900.82
Reimbursable accounts settled	1,275.03
	135,678.85
June 30, 1918, expended during fiscal year	119,168.60
July 1, 1918, balance unexpended	16,510.25
July 1, 1918, outstanding liabilities	16,510.25

Appropriation for flood control, Mississippi River, and Sacramento River, Cal., sundry civil act June 12, 1917.

UPPER TENSAS LEVEE DISTRICT.

August 7, 1917, approved allotment		$420,000.00
June 30, 1918, expended during fiscal year		175,202.62
July 1, 1918, balance unexpended		244,797.38
July 1, 1918, outstanding liabilities	$65,894.08	
July 1, 1918, amount covered by uncompleted contracts	83,178.33	
		149,072.41
July 1, 1918, balance available		95,724.97

LOWER YAZOO LEVEE DISTRICT.

Aug. 7, 1917, approved allotment		420,000.00
Transferred from Star Landing, Miss., first and second districts		120,000.00
		540,000.00
June 30, 1918, expended during fiscal year		242,022.68
July 1, 1918, balance unexpended		297,977.32
July 1, 1918, outstanding liabilities	$85,089.60	
July 1, 1918, amount covered by uncompleted contracts	167,028.73	
		252,118.33
July 1, 1918, balance available		45,858.99

SURVEYS, THIRD DISTRICT.

Aug. 7, 1917, approved allotment	5,000.00
June 30, 1918, expended during fiscal year	491.48
July 1, 1918, balance unexpended	4,508.52
July 1, 1918, outstanding liabilities	2,272.75
July 1, 1918, balance available	2,235.77

ASHBROOK NECK, MISS.

Aug. 7, 1917, approved allotment	72,000.00
June 30, 1918, expended during fiscal year	64,550.68
July 1, 1918, balance unexpended	7,449.32
July 1, 1918, outstanding liabilities	3,721.47
July 1, 1918, balance available	3,727.85

FITLERS BEND, MISS.

Aug. 7, 1917, approved allotment	$130,000.00
June 30, 1918, expended during fiscal year	123,957.04
July 1, 1918, balance unexpended	6,042.96
July 1, 1918, outstanding liabilities	4,471.47
July 1, 1918, balance available	1,571.49

COTTONWOOD, MISS.

Aug. 7, 1917, approved allotment	140,000.00
Reimbursable accounts settled	222.50
	140,222.50
June 30, 1918, expended during fiscal year	126,923.59
July 1, 1918, balance unexpended	13,298.91
July 1, 1918, outstanding liabilities	10,870.47
July 1, 1918, balance available	2,428.44

REID-BEDFORD BEND, LA.

Aug. 7, 1917, approved allotment	52,000.00
June 30, 1918, expended during fiscal year	10,994.95
July 1, 1918, balance unexpended	41,005.05
July 1, 1918, outstanding liabilities	19,073.54
July 1, 1918, balance available	21,931.51

GREENVILLE, MISS.

Aug. 7, 1917, approved allotment	40,000.00
Reimbursable accounts settled	1,824.18
	41,824.18
June 30, 1918, expended during fiscal year	41,824.18

PRINCETON, MISS.

Aug. 7, 1917, approved allotment	120,000.00
Reimbursable accounts settled	264.50
	120,264.50
June 30, 1918, expended during fiscal year	84,270.84
July 1, 1918, balance unexpended	35,993.66
July 1, 1918, outstanding liabilities	11,359.13
July 1, 1918, balance available	24,634.53

GRAND LAKE, ARK.

Aug. 7, 1917, approved allotment	80,000.00
June 30, 1918, expended during fiscal year	46,302.08
July 1, 1918, balance unexpended	33,697.92
July 1, 1918, outstanding liabilities	21,593.72
July 1, 1918, balance available	12,104.20

REPAIRS TO EXISTING WORKS AND STONE.

Aug. 7, 1917, approved allotment	$50,000.00
Reimbursable accounts settled	3,145.01
	53,145.01
June 30, 1918, expended during fiscal year	35,686.42
July 1, 1918, balance unexpended	17,458.59
July 1, 1918, outstanding liabilities	13,058.47
July 1, 1918, balance available	4,400.12

PLANT, THIRD DISTRICT.

Aug. 7, 1917, approved allotment	108,000.00
Reimbursable accounts settled	4,196.21
	112,196.21
June 30, 1918, expended during fiscal year	109,628.39
July 1, 1918, balance unexpended	2,567.82
July 1, 1918, outstanding liabilities	2,567.82

Appropriation for increase of compensation, rivers and harbors, 1918, sundry civil act, June 12, 1917.

June 30, 1918, expended during fiscal year	$4,592.63
July 1, 1918, outstanding liabilities	493.38

Funds contributed for flood control, Mississippi River, special fund, under flood-control act of Mar. 1, 1917.

UPPER TENSAS LEVEE DISTRICT.

Contributed by—		
Fifth Louisiana levee district		$71,334.00
Southeast Arkansas levee district		46,666.67
Tensas Basin levee district		92,000.00
		210,000.67
June 30, 1918, expended during fiscal year		70,373.75
July 1, 1918, balance unexpended		139,626.92
July 1, 1918, outstanding liabilities	$42,655.25	
July 1, 1918, amount covered by uncompleted contracts	46,666.67	
		89,321.92
July 1, 1918, balance available		50,305.00

LOWER YAZOO LEVEE DISTRICT.

Contributed by Board of Mississippi Levee Commissioners		270,001.00
June 30, 1918, expended during fiscal year		128,526.06
July 1, 1918, balance unexpended		141,474.94
July 1, 1918, outstanding liabilities	$30,824.50	
July 1, 1918, amount covered by uncompleted contracts	87,719.94	
		118,544.44
July 1, 1918, balance available		22,930.50

GREENVILLE, MISS.

Contributed by—	
Board of Mississippi Levee Commissioners	22,500.00
City of Greenville, Miss	13,000.00
	35,500.00
June 30, 1918, expended during fiscal year	35,500.00

Miscellaneous receipts.

June 17, 1917, receipts from rent of plant	$100.00
July 18, 1917, deposited to credit of the Treasurer of the United States	100.00

APPENDIX 4.

IMPROVING MISSISSIPPI RIVER, FOURTH DISTRICT.

This district extends from Warrenton, Miss., 7½ miles below Vicksburg, Miss., to the Head of the Passes, about 13 miles from the Gulf of Mexico, a distance of 453 miles by river.

District headquarters: New Orleans, La.

District engineer: Lieut. Col. George McC. Derby, United States Army, retired.

President, Mississippi River Commission: Col. James G. Warren, Corps of Engineers, United States Army, acting president to July 10, 1917; Brig. Gen. W. H. Bixby, United States Army, acting president, July 10–18, 1917; president since.

WORKS.

I. Revetments:
  (*a*) Hard Times Bend.
  (*b*) Bondurant Chute.
  (*c*) Kempe Bend.
  (*d*) Harbors at Natchez, Miss., and Vidalia, La.
  (*e*) Junction of the Mississippi, Red, and Atchafalaya Rivers.
  (*f*) Grand Bay.
  (*g*) Plaquemine, La.
  (*h*) Harbor at New Orleans, La.
  (*i*) General repairs and stone.

II. Levees:
  (*a*) Lower Tensas levee district.
  (*b*) Atchafalaya levee district.
  (*c*) Lafourche levee district.
  (*d*) Barataria levee district.
  (*e*) Homochitto levee district.
  (*f*) Pontchartrain levee district.
  (*g*) Lake Borgne levee district.

III. Surveys.

IV. Plant:
  (*a*) Revetment plant.
  (*b*) Levee plant.

I. REVETMENTS.

(*a*) *Hard Times Bend.*

Location and description.—Six hundred and thirty-three miles below Cairo, right bank.

Original condition.—Caving in this bend has been in progress from an early date. The exact date when caving commenced is not known. The caving continued until, in 1910, it threatened the controlling levee line crossing the foot of Lake St. Joseph. The destruction of this line would necessitate the building of a long and expensive loop levee back of the lake and the abandonment of much valuable land.

Previous projects.—None.

Existing project.—The present project was adopted by the Mississippi River Commission in 1910 and is to protect, with standard revetment of willow mattresses and upper-bank paving, those caving banks where the levee line in Hard Times Bend is most threatened.

Operations and results during fiscal year.—No construction work was done during the year. The expenditures, amounting to $8,636.37, were for surveys, material, and proportion of care, repair, and maintenance of plant belonging to revetment works in the district.

Condition at end of fiscal year.—The effective length of the revetment, 7,689 linear feet, consisting of brush mattresses from 300 to 400 feet wide for the subaqueous bank, and rock or concrete pavement for upper-bank protection. Extension of the work upstream for about 2,000 feet and downstream for about 1,000 feet will be required to protect the threatened part of the levee line; it will have to be further extended from time to time. The revetment in place is apparently in good condition, except at the ends, where there has been some loss.

The expenditures on existing project to end of fiscal year were $263,506.83 for new work and $50,407.02 for maintenance, making a total of $313,913.85.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate, and deepen the channel, to protect the banks of the river, and to preserve the controlling levee line.

Proposed operations.—It is proposed to make such repairs as may be necessary to preserve the continuity of the existing revetment, widening it where the channel of the river has destroyed the outer edge of the mats, and making such extensions as the available funds and the supply of labor may permit.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $313,913.85:

New work	$263, 506. 83
Maintenance	50, 407. 02
Net total expended	313, 913. 85
Total appropriations to June 30, 1918	[1] 401, 165. 17

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [2]	$140, 609. 13	$9, 691. 59	$90, 012. 77	$21, 390. 58	....
Expended for maintenance [2]	....	507. 76	6, 903. 10	31, 952. 51	$8, 636. 37
Total expended [2]	140, 609. 13	10, 199. 35	96, 915. 87	53, 343. 09	8, 636. 37
Appropriated or allotted	10, 000. 00	126, 000. 00	100, 000. 00	25, 165. 18	....

July 1, 1917, balance unexpended	$75, 722. 52
Amount appropriated by sundry civil act approved June 12, 1917	25, 165. 18
	100, 887. 70
Deduction on account of transfer to first and second Mississippi River districts	5, 000. 01
	95, 887. 69
June 30, 1918, amount expended during fiscal year,[2] for maintenance	8, 636. 37
July 1, 1918, balance unexpended	87, 251. 32
July 1, 1918, balance available for maintenance for fiscal year ending June 30, 1919	87, 251. 32
Amount (estimated) required to be appropriated for completion of existing project	[3] Indeterminate

Amount that can be profitably expended in fiscal year ending June 30, 1920:

For new work	[3] Indeterminate
For maintenance	[3] Indeterminate

---

[1] Total amount, $406,165.18, $5,000.01 transferred to first and second Mississippi River district.

[2] Not deducting receipts from sales, etc.

[3] Exclusive of available funds.

(*b*) *Bondurant Chute.*

Location and description.—Six hundred and forty-three miles below Cairo, right bank.

Original condition.—Caving in this bend commenced in 1880, and continued until 1889, when it threatened the line of levee between the river and Lake Bruin. The abandonment of the existing levee would have necessitated the construction of a long line of new levee behind Lake Bruin and the exposure to overflow of a large area of cultivated land.

Previous projects.—None.

Existing project.—The present project was adopted by the Mississippi River Commission in 1899, and provided for revetting the caving bank with board mattresses 100 feet wide, grading the upper bank and paving it with concrete in situ. The project was modified in 1900 to provide for the use of standard mattresses of willow brush. A further modification in 1903 provided for the use of rock for upper bank paving.

Operations and results during fiscal year.—Work at this locality consisted of making extensive repairs between sections 6 and 10. Practically new revetment was required covering about 1,400 linear feet of bank. The upper bank was graded by hand and paved with rock for 1,145 linear feet, requiring 815 squares, and the subaqueous bank mattressed 300 feet wide for 1,400 linear feet, requiring the placing of 3,500 squares.

Operations were commenced September 24. 1917, and continued from time to time as plant was available and the stage of the river permitted work, until March 28, 1918, when all work contemplated was completed.

The work was done by hired labor with Government plant at a total cost of $57,231.16 for maintenance. The field cost amounted to $56,412.82 and the actual money expended $42,310.92 the difference being due to credits for materials on hand.

The detailed costs are shown in the following tables:

BONDURANT CHUTE (643 R), FOURTH DISTRICT.

Mattresses, total area, 3,500 squares.

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$781.40		$0.223
Lumber ... feet	200,576	3,630.23	57,307	1.037
Wire No. 12 ... pounds	1,429	60.49	.408	.017
Nails, wire	22,238	839.40	6.354	.240
Treenails ... number	31,576	69.12	9.022	.020
Brush and poles ... cords	3,580	8,509.95	1.023	2.431
Coal ... tons	12	69.00	.003	.020
Oil	170	35.90	.048	.010
Miscellaneous expenses		775.34		.222
Subsistence		3,669.58		1.048
Steamboat expenses		2,722.50		.778
Labor		6,390.01		1.826
Supervision		880.00		.251
Total field cost		28,432.92		8.123

BONDURANT CHUTE (643 R), FOURTH DISTRICT—continued.

Channel mats, 3,064¼ squares; connecting mats, 436 squares.

BALLASTING AND SINKING.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$184.76		$0.053
Lumber...feet	2,422	48.44	0.692	.014
Wire No. 12...pounds	1,200	53.28	.343	.015
Nails, wire	1.974	78.77	.564	.023
Stone...tons	2.728	7,595.17	.779	2.171
Coal...do	6	34.50	.002	.009
Oil	60	6.00	.017	.002
Miscellaneous expenses		340.12		.097
Subsistence		1,230.66		.351
Steamboat expenses		2,940.00		.840
Labor		2,357.06		.673
Supervision		471.41		.134
Total field cost		15,340.17		4.382

Grading, 1,145 linear feet, or 815 squares.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Oil	75	$42.04	0.092	$0.052
Miscellaneous expenses		4.10		.005
Subsistence		218.95		.269
Labor		545.79		.669
Supervision		99.79		.122
Total field cost		910.67		1.117

Paving (rock and concrete), 1,145 linear feet, or 815 squares.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$143.07		$0.176
Stone...tons	3,026	8,402.26	3.713	10.309
Miscellaneous expenses		111.25		.137
Subsistence		771.56		.946
Steamboat expenses		108.35		.133
Labor		1,424.28		1.747
Supervision		287.54		.353
Total field cost		11,248.31		13.801

Summary of costs (1,400 linear feet revetment).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.[1]	Total.		
Total field cost	12.506	48,773.09	14.919	12,158.98	55,932.07	38.951
Office expenses	.183	642.00	.216	176.34	818.34	.585
Surveys [2]	.107	376.00	.128	104.75	480.75	.344
Care of plant [3]	.052	179.00	.061	49.62	228.62	.163
Repair of plant	.219	764.00	.256	209.00	973.00	.695
Depreciation of plant [4]	.676	2,367.70	.806	656.59	3,024.29	2.160
Total	13.743	48,101.79	16.386	13,355.28	61,457.07	43.898

---

[1] Cost per square completed upper bank work.

[2] This item includes actual cost of survey work done on this revetment.

[3] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[4] Depreciation in to be taken at 6 per cent of first cost per annum for all plants with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of fiscal year.—A total of 4,150 linear feet of bank protection has been placed, all of which is believed to be in good condition. Changes in the channel of the chute above has produced filling along the upper part of the revetment and scour in the channel along the lower part. There has been some little change in the bank line below the revetment but it is not believed that any further extension of the work will be required for several years.

The expenditures on existing project to the end of the fiscal year were $62,452.82 for new work and $70,217.99 for maintenance, making a total of $132,670.81.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate, and deepen the channel, to protect the banks of the river and preserve the controlling levee line.

Proposed operations.—It is proposed to make such repairs as may be necessary to preserve the continuity of the existing revetment, widening it where the channel of the river has destroyed the outer edge of the mats, and making such extensions as the available funds and the supply of labor may permit.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $132,670.81:	
New work	$62, 452. 82
Maintenance	70, 217. 99
Net total expended	132, 670. 81
Total appropriations to June 30, 1918	139, 151. 81

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [1]	$7,691.82	$957.45	....	....	....
Expended for maintenance [1]	992.39	440.02	$1,210.71	$11,859.84	$42,310.97
Total expended [1]	8,684.21	1,397.47	1,210.71	11,859.84	42,310.97
Appropriated or alloted	....	....	35,000.00	25,651.81	....

[1] Not deducting receipts for sales, etc.

July 1, 1917, balance unexpended	$23, 140. 16
Amount appropriated by sundry civil act approved June 12, 1917	25, 651. 81
	58, 791. 97
June 30, 1918, amount expended during fiscal year [1] for maintenance	42, 310. 97
July 1, 1918, balance unexpended	6, 481. 00
July 1, 1918, outstanding liabilities, amount covered by uncompleted contracts	444. 66
July 1, 1918, balance available, for maintenance	6, 036. 34
Amount available for fiscal year ending June 30, 1919	6, 036. 34
Amount (estimated) required to be appropriated for completion of existing project	[2] Indeterminate
Amount that can be profitably expended in fiscal year ending June 30, 1920	[2] Indeterminate

---

[1] Not deducting receipts from sales, etc.
[2] Exclusive of available funds.

(c) *Kempe Bend.*

Location and description.—Six hundred and fifty-eight miles below Cairo, right bank.

Original condition.—Caving in this bend commenced about 1865 and continued with unusual rapidity, destroying one levee after another until 1899, when it had nearly reached a line the destruction of which would have necessitated a new levee of extremely difficult and costly construction. The construction of a new line would have required a long period of time, and a break in the front line in the meantime would have been disastrous to a large section of country.

Previous projects.—None.

Existing project.—The present project was adopted by the Mississippi River Commission in 1899, and provided for revetting the caving bend with standard revetment of willow mattresses and upper-bank paving of rock.

Operations and results during fiscal year.—Work in this bend consisted in restoring work lost and damaged by the high waters of 1915, 1916, and 1917. Repairs were made covering about 5,000 linear feet of bank, of which 3,555 feet consisted of entirely new work, requiring mats 300 to 600 feet wide, with upper bank protection of stone and concrete, where necessary.

The subaqueous bank was mattressed for 3,900 linear feet, requiring 14,576 squares; the upper bank was graded for 5,864 linear feet, and paved for 3,716 linear feet, requiring 564 squares of rock and 2,637 squares of concrete.

Operations were commenced July 26, 1917, and completed December 21, 1917.

The work was done by hired labor with Government plant at a total cost of $150,324.76 for maintenance.

The field cost amounted to $147,715.33, and the actual money expended $128,790.29, the difference being due to credits for materials on hand.

The detailed costs are shown in the following tables:

KEMPE BEND (658 R), FOURTH DISTRICT.

Mattresses, total area, 14,576 squares (channel mats, 12,466 squares; connecting mats, 2,110 squares).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$718.96		$0.049
Lumber ... feet	791.134	13,443.93	54.276	.922
Wire No. 12 ... pounds	4.692	175.95	.322	.012
Nails, wire ... do	84.509	2,818.71	5.798	.193
Treenails ... No	126.800	265.95	8.699	.018
Brush and poles ... cords	15.002	24,115.75	1.029	1.654
Rope, manila ... pounds	4.404	1,344.33	.302	.093
Coal ... tons	15	90.00	.001	.006
Oil ... gallons	150	15.00	.010	.001
Miscellaneous expenses		789.19		.054
Subsistence		6,078.00		.418
Steamboat expenses		2,985.00		.205
Labor		12,686.19		.870
Supervision		2,424.40		.166
Total field cost		67,951.35		4.661

BALLASTING AND SINKING.

Mobilization and demobilization		$719.62		$0.049
Lumber ... feet	31.978	639.56	2.194	.045
Wire No. 12 ... pounds	3.700	164.28	.254	.012
Nails, wire ... do	7.500	292.50	.515	.020
Stone ... tons	10.674	26,792.66	.732	1.838
Rope, manila ... pounds	4.404	1,344.33	.302	.093
Sand and gravel ... cubic yards	.269	88.98	.018	.006
Coal ... tons	13	79.20	.001	.005
Oil ... gallons	.200	42.81	.014	.003
Miscellaneous expenses		1,448.57		.099
Subsistence		3,313.70		.227
Steamboat expenses		6,530.00		.448
Labor		5,865.57		.402
Supervision		837.94		.057
Total field cost		48,159.72		3.304

KEMPE BEND (658 R), FOURTH DISTRICT—continued.

Grading (5,864½ linear feet or 6,111 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal....tons..	125	$747.84	0.020	$0.122
Oil....gallons..	175	89.19	.029	.015
Miscellaneous expenses....	....	231.81	....	.038
Subsistence....	....	2,527.20	....	.414
Steamboat expenses....	....	70.00	....	.011
Labor....	....	5,253.05	....	.859
Supervision....	....	750.43	....	.123
Total field cost....	....	9,669.52	....	1.582

Paving, rock and concrete (3,716 linear feet or 3,201 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization....	....	$93.34	....	$0.029
Stone....tons..	1.710	1,582.79	0.534	.494
Rope, manila....pounds..	4.404	1,344.33	.302	.420
Cement....sacks..	12.568	7,429.59	3.926	2.321
Sand and gravel....cubic yards..	5.000	1,700.00	1.562	.531
Coal....tons..	50	300.00	.016	.093
Oil....gallons..	60	30.93	.019	.010
Miscellaneous expenses....	....	422.08	....	.132
Subsistence....	....	1,627.60	....	.509
Steamboat expenses....	....	1,430.00	....	.447
Labor....	....	3,742.28	....	1.169
Supervision....	....	534.61	....	.167
Total field cost....	....	20,237.55	....	6.322

Summary of costs (3,900 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.[1]	Total.		
Total field cost....	$7.965	$116,111.08	$4.894	$29,907.07	$146,018.15	$37.440
Office expenses....	.142	2,074.70	.087	534.73	2,609.43	.669
Surveys [2]....	.092	1,349.00	.057	348.18	1,697.18	.435
Care of plant [3]....	.135	1,970.40	.082	507.94	2,478.34	.635
Repair of plant....	.580	8,449.00	.357	2,176.20	10,625.20	2.724
Depreciation of plant [4]....	.437	6,348.00	.268	1,634.66	7,982.66	2.048
Total....	9.351	136,302.18	5.745	35,108.78	171,410.96	43.951

[1] Cost per square completed upper bank work.

[2] This item includes actual cost of survey work done on this revetment.

[3] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[4] Depreciation in to be taken at 6 per cent of first cost per annum for all plants with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls.

In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of fiscal year.—A total of 28,616 linear feet of bank revetment has been placed consisting of brush mattresses for the subaqueous work, from 200 to 500 feet wide, with upper bank pavement of rock, and concrete.

Numerous failures of the revetment have occurred since work was commenced in 1899 and extensive repairs have been necessary.

Additional work is necessary to restore work already lost by caving or threatened by scour along the outside edge of the mats. It is estimated that extensive repairs are needed covering about 4,000 linear feet of revetment mostly in the middle part of the revetment. The mattress work was completed in 1913, but additional paving will be needed, as well as a large expenditure for maintenance, for several years.

The expenditures on existing project to the end of the fiscal year were $1,104,977.70 for new work and $433,971.44 for maintenance, making a total of $1,538,949.14.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate and deepen the channel, to protect the banks of the river and to preserve the controlling levee line.

Proposed operations.—It is proposed to make such repairs as may be necessary to preserve the continuity of the existing revetment, widening it where the channel of the river has destroyed the outer edge of the mats, and making such extensions as the available funds and the supply of labor may permit.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $1,538,949.14:	
New work	$1,104,977.70
Maintenance	433,971.44
Net total expended	1,538,949.14
Total appropriations to June 30, 1918	1,541,972.79

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [1]	....	....	....	....	....
Expended for maintenance [1]	$24,782.12	$52,142.03	$9,009.65	$54,602.40	$128,790.29
Total expended [1]	24,782.12	52,142.03	9,009.65	54,602.40	128,790.29
Appropriated or allotted	60,000.00	20,000.00	65,000.00	101,972.79	....

[1] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended	$29,841.15
Amount appropriated by sundry civil act approved June 12, 1917	101,972.79
	131,813.94
June 30, 1918, amount expended during fiscal year[1] for maintenance	128,790.29
July 1, 1918, balance unexpended	3,023.65
July 1, 1918, balance available for maintenance	3,023.65
Amount available for fiscal year ending June 30, 1919	3,023.65
Amount (estimated) required to be appropriated for completion of existing project	[2] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920	[2] Indeterminate.

---

[1] Not deducting receipts from sales, etc.

[2] Exclusive of available funds.

(*d*) *Harbors at Natchez, Miss., and Vidalia, La.*

Location and description.—From 687 to 700 miles below Cairo, left and right banks.

Original condition.—Caving of the river banks in Giles and Marengo Bends, and in front of the city of Natchez, was in existence as far back as any authentic record exists. In Giles Bend the caving had progressed to such an extent that a cut-off was threatened through the neck of land between Giles and Cowpen Bends, which cut-off would have destroyed the harbors of Natchez and Vidalia, as well as causing a serious disturbance of the general régimen of the river for many miles above and below. In Marengo Bend the caving had destroyed the last practicable line of levees between Lake Concordia and the river, and caused the construction of a new line behind the lake in 1881. Many thousand acres of valuable farming lands had been destroyed. The caving continued and in 1912 threatened the destruction of the new line behind the lake as well as an important railroad line. In front of the city of Natchez, continued caving had destroyed nearly all of the historic "Natchez-under-the-hill," and was threatening the site of the waterworks supplying the city of Natchez.

Previous projects.—The work originated in a congressional joint resolution passed June 28, 1879. The project provided for protecting the caving banks in Giles and Marengo Bends with brush and stone. Work was carried on under this project during 1881 and 1882. Amount expended $82,470.91. No trace of this work remains.

Existing project.—Under act of August 2, 1882, the work was placed under the direction of the Mississippi River Commission, but remained dormant, except for frequent surveys and examinations, until 1892. On November 7, 1892, the commission adopted a project calling for the construction of a levee along the axis of Cowpen Neck to prevent the flow of water during high stages of the river across the neck and consequent danger of a cut-off. On March 30, 1897, a project was adopted for the protection of the bank in Giles Bend by means of submerged sloping spur dikes placed at intervals of about 450 feet. In 1899 the project was modified to provide for continuous revetment of the standard type, with mattresses 300 feet wide, together with upper-bank pavement, the latter to be placed only after the action of the river had graded the upper bank to a sufficiently flat slope. This restriction, so far as it related to work subsequent to 1899, was removed in June, 1900. In 1907 the project was modified to include the revetment of the Natchez front with standard revetment and in 1912 to include the revetment of Marengo Bend.

Operations and results during fiscal year.—The harbors of Natchez and Vidalia include improvement works in Giles Bend, Marengo Bend, and along the front of the city of Natchez.

Giles Bend.—Work in this bend consisted of restoring slopes of the spur levee and restoring pavement at outer end, where damaged by the high water of 1916–17, and repairing two breaks near the upper end of the revetment.

The slopes of the spur levee were restored for 2,200 linear feet, requiring about 9,000 cubic yards of earth, and the end and slopes of the levee were regraded and paved, requiring 150 squares of rock pavement.

The subaqueous bank was mattressed for 633 linear feet, requiring 3,708 squares, and upper-bank paving repaired for 200 linear feet, requiring 12 squares. Owing to the high stage of the river at the time the mattresses were placed it was not practicable to complete the paving of the upper bank.

The great width of the mattresses required to reach beyond deepest water in upper Giles, the shortage of labor, the scarcity of willows, and the swift current made the work slow and expensive.

Operations were commenced on repairs to levee on February 12, 1918. About April 1, 1918, the construction and sinking of mats was commenced and continued until June 30, 1918.

The work was done by hired labor with Government plant at a total cost of $56,005.34 for maintenance.

The detailed field costs (exclusive of $6,759.20 for maintenance of levee) which amounted to $49,854.97, are shown in the following tables:

GILES BEND (687 L), FOURTH DISTRICT.

Mattresses, total area, 3,708 squares (channel mats, 2,626 squares; connecting mats, 1,082 squares).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$877.94	....	$0.237
Lumber ... feet	185,771	3,803.28	50.100	1.026
Wire, No. 12 ... pounds	1,891	85.28	.510	.023
Nails, wire	23,064	877.80	6.220	.237
Treenails ... number	25,214	67.75	6.799	.018
Brush and poles ... cords	4,200	11,000.00	1.133	2.966
Rope, manila ... pounds	2,977	908.00	.802	.245
Coal ... tons	15	90.00	.004	.025
Oil	75	33.95	.020	.009
Miscellaneous expenses	....	533.79	....	.144
Subsistence	....	2,692.79	....	.726
Steamboat expenses	....	2,200.00	....	.593
Labor	....	5,522.42	....	1.489
Supervision	....	1,566.00	....	.422
Total field cost	....	30,259.00	....	8.160

BALLASTING AND SINKING.

Mobilization and demobilization	....	$799.96	....	$0.215
Lumber ... feet	4,400	90.71	1.186	.024
Wire, No. 12 ... pounds	1,372	61.88	.370	.017
Nails, wire	2,076	79.80	.559	.021
Stone ... tons	3,107	9,385.20	.838	2.531
Rope, manila ... pounds	2,977	908.00	.803	.245
Coal ... tons	15	90.00	.004	.024
Oil	70	7.82	.018	.002
Miscellaneous expenses	....	499.72	....	.135
Subsistence	....	1,046.44	....	.282
Steamboat expenses	....	1,785.00	....	.481
Labor	....	3,273.23	....	.882
Supervision	....	484.00	....	.133
Total field cost	....	18,511.76	....	4.992

Paving, rock and concrete (200 linear feet or 12 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Rope, manila ... pounds	27	$8.00	2.250	$0.667
Miscellaneous expenses	....	38.36	....	3.197
Subsistence	....	31.51	....	2.626
Labor	....	78.00	....	6.500
Supervision	....	10.00	....	.833
Total field cost	....	165.87	....	13.823

GILES BEND (687 L), FOURTH DISTRICT—continued.

Summary of cost (633 linear feet revetted).

	Subaqeous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.[1]	Total.		
Total field cost	$13.153	$48,770.76	$13.822	$165.87	$48,936.63	$58.747
Office expenses	1.653	6,129.06	1.776	21.31	6,150.37	7.383
Surveys [2]	.246	914.00	.362	4.34	918.34	1.102
Care of plant [3]	.247	916.00	6.906	82.87	998.87	1.199
Repair of plant	1.130	4,191.00	4.438	53.25	4,244.25	5.096
Depreciation of plant [4]	.780	2,893.00	.813	9.76	2,902.76	3.485
Total	17.209	63,813.82	28.117	337.40	64,151.22	77.012

[1] Cost per square completed upper bank work.

[2] This item includes actual cost of survey work done on this revetment.

[3] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[4] Depreciation in to be taken at 6 per cent of first cost per annum for all plants with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Marengo Bend.—Work during the year was confined to making repairs to existing revetment.

Considerable material was accumulated during the early part of the season and on November 9, 1917, grading of the upper bank was commenced and continued until January 31, 1918, when after sinking one mattress at section 20, it was found impracticable to continue the work on account of the swiftness of the current and shortage of labor.

A total of 873 squares of mattress was placed, covering 150 linear feet of bank; the upper bank was graded for 1,253 linear feet and paved for 950 linear feet, requiring 314 squares of pavement.

The work was done by hired labor with Government plant at a total cost of $33,859.58 for maintenance.

The detailed field costs, which amounted to $30,889.91, are shown in the following tables:

MARENGO BEND (692 R), FOURTH DISTRICT.

Mattresses, total area, 873 squares (channel mats, 663 squares; connecting mats, 210 squares).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$450.50	....	$0.516
Lumber ... feet	47,825	905.02	54.212	1.038
Wire, No. 12 ... pounds	279	10.46	.319	.013
Nails, wire	4,954	176.42	5.674	.202
Treenails ... number	7,071	13.66	8.091	.016
Brush and poles ... cords	899	2,187.12	1.029	2.505
Rope, manila ... pounds	2,014	614.33	2.307	.704
Coal ... tons	22	110.00	.026	.126
Oil ... gallons	100	10.00	.114	.011
Miscellaneous expenses	....	220.32	....	.252
Subsistence	....	1,750.63	....	2.005
Steamboat expenses	....	960.00	....	1.099
Labor	....	2,251.06	....	2.578
Supervision	....	405.39	....	.464
Total field cost	....	10,064.91	....	11.529

MARENGO BEND (692 R), FOURTH DISTRICT—continued.

Mattresses, total area, 873 squares (channel mats, 663 squares; connecting mats, 210 squares)—Continued.

BALLASTING AND SINKING.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$598.47		$0.686
Lumber ... feet	3,757	75.14	4.303	.086
Wire, No. 12 ... pounds	400	17.32	.458	.020
Nails, wire	600	24.00	.687	.027
Stone ... tons	636	1,848.24	.751	2.117
Rope, manila ... pounds	2,014	614.33	2.307	.704
Coal ... tons	5	25.00	.005	.029
Oil ... gallons	125	37.51	.143	.043
Miscellaneous expenses		377.60		.432
Subsistence		264.60		.303
Steamboat expenses		530.00		.607
Labor		696.61		.798
Supervision		99.51		.114
Total field cost		5,208.33		5.966

Grading (1,253 linear feet or 1,901 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$264.75		$0.139
Coal ... tons	122	801.33	0.064	.422
Oil ... gallons	150	50.00	.079	.026
Miscellaneous expenses		257.62		.136
Subsistence		1,320.00		.694
Steamboat expenses		390.00		.205
Labor		3,875.69		2.039
Supervision		621.56		.327
Total field cost		7,580.95		3.988

Paving, rock and concrete (950 linear feet or 314 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		$690.02		$2.196
Stone ... tons	703	1,823.13	2.238	5.806
Rope, manila ... pounds	2,014	614.33	2.307	1.956
Coal ... tons	10	50.00	.032	.159
Oil ... gallons	100	10.00	.318	.032
Miscellaneous expenses		528.96		1.685
Subsistence		405.00		1.290
Steamboat expenses		1,900.00		6.051
Labor		1,161.42		3.699
Supervision		224.34		.714
Total field cost		7,407.20		23.590

MARENGO BEND (692 B), FOURTH DISTRICT—continued.

Summary of costs (150 linear feet revetted).

Items.	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.[1]	Total.		
Total field cost	$17.495	$15,273.24	$7.884	$14,988.15	$30,261.39	$31.854
Office expenses	1.718	1,500.00	.773	1,469.67	2,969.67	3.126
Surveys [2]	.648	565 67	.033	62.85	628 52	.662
Care of plant [3]	.487	425.00	.221	420.57	845 57	.890
Repair of plant	2.088	1,823 00	.967	1,838.62	3,661.62	3.854
Depreciation of plant [4]	.992	866.50	.448	850.43	1,716.93	1.807
Totals	23.428	20,453.41	10.326	19,630.29	40,083.70	42.193

[1] Cost per square completed upper bank work.

[2] This item includes actual cost of survey work done on this revetment.

[3] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[4] Depreciation in to be taken at 6 per cent of first cost per annum for all plants with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Natchez front.—No construction work was done during the year. The expenditures amounting to $3,100.12 were for surveys, material, and share of care, repair, and maintenance of plant belonging to the revetment works in the district.

The total field costs for Giles Bend, Marengo Bend, and Natchez front amounted to $83,845 and the actual money expended $102,287.47, the difference being due to materials purchased and paid for and now on hand.

Condition at end of fiscal year.—In Giles Bend a total of 20,917 linear feet of bank revetment has been placed, consisting of spur dikes, brush mattresses from 300 to 500 feet wide, with upper bank protection of stone and concrete for 17,340 linear feet.

A spur levee 16.621 feet long has been completed to commission grade on the axis of Cowpen Point.

The work has been successful in preventing the threatened cut-off between Giles and Cowpen Bends, although numerous failures of the revetment have occurred, principally along the middle and lower ends.

Some additional repairs are required but generally the work is in good condition.

In Marengo Bend the bank has been protected for 12,844 linear feet consisting of brush mattresses from 300 to 500 feet wide for the subaqueous work and stone and concrete for upper bank protection. Several caves during 1916 and 1917 high waters destroyed or badly damaged portions of the revetment and it is estimated that repairs will be required covering about 3.000 linear feet of revetment. The remainder of the revetment appears to be in fairly good condition.

On the Natchez front the bank has been protected for 3 536 linear feet in two detached pieces, upper 2.136 feet long and lower 1,400 feet long, separated by an unprotected gap of about 1,600 feet.

The work consists of mats 300 feet wide with upper bank protection of rock where found necessary. The work has been successful in preventing further recession of the bank on the harbor front.

The project for improving the harbors at Natchez and Vidalia, Miss. and La., has not been completed. Further extensions of the work in Marengo Bend and along the Natchez front will likely be required from time to time. The project is about 80 per cent completed.

The total expenditures on existing project to end of fiscal year in Giles Bend were $1,296,587.54 for new work and $475.829.70 for maintenance, making a total of $1,772,417.24; in Marengo Bend $381.857 for new work and $130,310.50 for maintenance, making a total of $512,167.50; on the Natchez front $120,780.26 for new work and $8,858.34 for maintenance, making a total of $129,588.60.

Local cooperation.—None.

Terminal facilities.—Consist of a good landing place for steamboats plying on the Mississippi River, and an incline railroad for transfer of freight to the landing place. These facilities are considered adequate for existing commerce.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate, and deepen the channel, to protect the banks of the river, to preserve generally the controlling levee line, to prevent a cut-off between Giles and Cowpen Bends, and to preserve the harbor front and waterworks of the city of Natchez.

Proposd operations.—It is proposed to make such repairs as may be necessary to preserve the continuity of the existing revetment, widening it where the channel of the river has destroyed the outer edge of the mats, and making such extensions as the available funds and the supply of labor may permit.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $2,414,173.34;	
New work	$1,799,174.80
Maintenance	614,998.54
Net total expended	2,414,173.34
Total appropriations to June 30, 1918	[1] 2,495,527.57

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [2]	$322,165.54	$8,373.42	$57,485.66		
Expended for maintenance [2]	17,153.63	56,133.10	78,590.61	$163,066.76	$102,287.47
Total expended [2]	339,319.17	64,506.52	136,076.27	163,066.76	102,287.47
Appropriated or allotted	67,000.00	183,000.00	200,000.00	77,022.57	

July 1, 1917, balance unexpended	$106,614.13
Amount appropriated by sundry civil act approved June 12, 1917	97,022.57
	203,636.70
Deduction on account of transfer to "Bondurant"	20,000.00
	183,636.70
June 30, 1918, amount expended during fiscal year [2] for maintenance	102,287.47
July 1, 1918, balance unexpended	81,349.23
July 1, 1918, outstanding liabilities	13,058.25
July 1, 1918, balance available for maintenance	68,290.98
Amount available for fiscal year ending June 30, 1919	68,290.98
Amount (estimated) required to be appropriated for completion of existing projects	[3] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920	[3] Indeterminate.

---

[1] Total amount, $2,515,527.57; $200,000 transferred to "Bondurant."
[2] Not deducting receipts from sales, etc.
[3] Exclusive of available funds.

(e) *Junction of the Mississippi, Red, and Atchafalaya Rivers.*

Location and description.—Seven hundred and sixty-four miles below Cairo, right bank.

Original condition.—Prior to 1831, the Red River entered the Mississippi and the Atchafalaya flowed out from the Mississippi near the apex of a long horseshoe-shaped bend. In 1831 the Shreve cut-off was made across the narrow part of the peninsula forming the interior of the horseshoe bend, and left the mouth of Red and head of the Atchafalaya in a lake with a precarious and uncertain connection with the Mississippi River. In the course of time the entrance to and channel through this lake, known as Old River, became greatly obstructed during low water by sand bars and shoals. In addition to this, the channel of the Atchafalaya, forced to carry all of Red River, augmented during floods in the Mississippi by water from the latter stream, commenced to enlarge with great rapidity, until there was an apprehension that the Mississippi would desert its present channel and flow to the Gulf of Mexico via the Atchafalaya.

Previous projects.—The project adopted by act of June 18, 1878, provided for maintaining a navigable channel during low water between the Mississippi, Red, and Atchafalaya by means of dredging and washing the channel with tugboats and a stern-wheel steamboat. The act of August 2, 1882, transferred the supervision of the work to the Mississippi River Commission. The modified project adopted in 1896–97, provided for the construction of six low relief dams across the Atchafalaya near Simmsport, La., to prevent the further enlargement of that stream; the construction of a dam across Old River between the mouth of Red and head of the Atchafalaya; the reopening of a channel to the Mississippi River by way of upper Old River, and the maintenance of navigation during low water by dredging. In 1897 this project was modified to provide only for the maintenance of navigation by dredging, and for maintenance of the sill dams already built, Nos. 1 and 3. Prior to 1897, the dam across Old River had been destroyed; first by making a cut through it, and, subsequently, by the current of the river.

Existing project.—The present project, adopted in 1897 by the Mississippi River Commission, provides for the securing of low-water navigation between the Mississippi, Red, and Atchafalaya Rivers by dredging; the maintenance of sill dams Nos. 1 and 3 in the Atchafalaya; and to repair, care for, and improve the hydraulic dredge, *The Ram*, belonging to the work.

Operations and results during fiscal year.—The subproject for this work was to do such dredging as might be necessary to maintain low-water navigation between the Mississippi, Red, and Atchafalaya Rivers through lower Old River, to repair and maintain the sill dams in the Atchafalaya, and to repair and care for the hydraulic dredge, *The Ram;* all work was done by day labor and Government-owned plant.

The river having fallen to a stage of 21 on the Red River Landing gauge, and there being but 13.5 feet of water in the channel over the bar at the entrance to Old River, dredging by the hydraulic dredge *The Ram* was commenced July 30, 1917, and continued until October 16, 1917, operated by a double crew. On this last date a serious breakdown of the main pumping engines put *The Ram* out of service.

She was replaced for a short time by one of the large Mississippi River Commission dredges. Navigation was not obstructed during the year. The lowest reading of the Red River Landing gauge was 4.1. The total length of the channel dredged was about 1,450 feet and the total amount of sand pumped was about 147,398 cubic yards. Later on in the spring of 1918 *The Ram* was operated in pumping sand and gravel for the manufacture of concrete ballast.

So far as known, the sill dams in the Atchafalaya remain in good condition. The usual hydrographic survey of the Mississippi in the vicinity of the mouth of Red River, of lower Old River, and over the sill dams in the Atchafalaya has been made. Changes at the sill dams have been slight and unimportant and in the direction of fill. In Old River there is a continuance of the enlargement noted in previous years.

The field work was in charge of Asst. Engineer H. S. Douglas.

The amount expended from July 1, 1917, to June 30, 1918, is $12,220.42, distributed as follows:

Dredging	$5,048.40
Surveys	1,543.11
Repairs to plant	4,216.00
Overhead	581.84
Miscellaneous	831.07
Total	12,220.42
Depreciation of plant	757.00
Gross total	12,977.42

Condition at end of fiscal year.—The work consists of two large brush and stone sill dams in the Atchafalaya to restrict its outlet capacity, and the maintenance by dredging of low-water navigation between the Mississippi, Red, and Atchafalaya Rivers. The work has been successful, and the sill dams, so far as is known, are in good condition. The work is not susceptible of permanent completion, as annual dredging at low water is necessary to remove the deposits made during high water. The sill dams will have to be maintained.

Total expenditures on existing project were $672,332.35 for new work, and $620,452.58 for maintenance, making a total of $1,292,784.93. The project is not susceptible of completion.

Local cooperation.—Prior to the United States assuming charge of this work in 1878, the State of Louisiana had endeavored to maintain navigation. Owing to lapse of time, the amount expended by the State is unobtainable.

Terminal facilities.—None.

Effect of improvement.—Low-water navigation between the Mississippi, Red, and Atchafalaya has been maintained, and the further enlargement of the Atchafalaya has been prevented.

Proposed operations.—It is proposed to make such repairs as may be necessary to preserve the continuity of the existing revetment, widening it where the channel of the river has destroyed the outer edge of the mats, and making such extensions as the available funds and the supply of labor may permit.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $1,292,784.93:

New work	$672,332.35
Maintenance	620,452.58
Net total expended	1,292,784.93
Total appropriations to June 30, 1918	[1] 1,296,228.87

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work					
Expended for maintenance [2]	$7,668.23	$5,990.72	$34,731.15	$21,977.32	$11,514.46
Total expended [2]	7,668.23	5,990.72	34,731.15	21,977.32	11,514.46
Appropriated or allotted	25,000.00	20,000.00	14,832.85	15,705.96	

---

[1] Total amount $1,296,495.96; $167.15 transferred to first and second Mississippi River districts.

[2] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended	$223.49
Amount appropriated by sundry civil act approved June 12, 1917	15,705.96
Receipts from sales, etc., during fiscal year 1918	2.00
	15,931.45
Deduction on acount of transfer to first and second Mississippi River district	167.15
	15,764.30
June 30, 1918, amount expended during fiscal year for maintenance[1]	12,220.42
July 1, 1918, balance unexpended	3,543.88
July 1, 1918, outstanding liabilities	662.27
July 1, 1918, balance available for maintenance	2,881.61
Amount available for fiscal year ending June 30, 1919	2,887.61
Amount (estimated) required to be appropriated for completion of existing project	[2] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920	[2] Indeterminate.

(*f*) *Grand Bay.*

Location and description.—Eight hundred and eight miles below Cairo, right bank.

Original condition.—Caving of the river banks at this locality had been in progress for many years, but the exact date is unknown. Within recent years caving became more and more active until the dikes (levees) across the lower end of False River were threatened. The destruction of these dikes would have probably entailed the building of a long and costly line of levee around False River and the abandonment to overflow of a large area of cultivated land.

Previous projects.—None.

Existing projects.—The project adopted August 21, 1916, provides for the protection of the caving bank for a distance of about 10,000 linear feet with mattresses 400 feet wide of brush and stone, the upper bank to be graded to a slope of at least 1 in 4 and paved with rock to the top of the bank.

Operation and results during fiscal year.—The work projected was to extend the existing revetment about 3,000 linear feet downstream, make necessary repairs and widen the mattress revetment where scour along the channel edge of the mattresses made additional protection imperative. The work was prosecuted by day labor with Government-owned plant. Mattress construction was commenced November 15, 1917, and all work practicable at the time, was completed on February 20, 1918. The most important work undertaken was the repair of the cave from section 7 to 8, about 400 feet in length. The mattresses sunk were 400 feet wide and comprised 1,883 squares covering 430 linear feet of bank. The upper bank was graded and paved with concrete over an area of 280 squares, covering 430 linear feet of bank. Near the upper end of the revetment additional mattresses were sunk to widen the existing revetment where scour had occurred outside the existing revetment. In all 1,200 squares of mattress covering 600 linear feet of bank were sunk in widening the revetment. An order to build and deliver 3,600 squares of mattress for work at the head of South Pass coming at a time when labor was unusually scarce compelled a suspension of work at Grand Bay and by the time these mattresses were completed the river had risen so that it was impracticable to do further work at Grand Bay during the season.

All of the work was done for the maintenance of existing revetment, a total of 3,082 squares of mattresses and 280 squares of concrete pavement were placed, covering 1,040 linear feet of bank. The total cost of the work was $52,293.64 for maintenance. The field cost amounted to $47,444.67 and the actual money expended was $65,540.18, the difference being due to credits for material on hand. The detailed cost is set forth in the accompanying tables.

---

[1] Not deducting receipts from sales, etc.

[2] Exclusive of available funds.

GRAND BAY (808 R), FOURTH DISTRICT.

Mattresses, total area, 3,081 squares.

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Lumber....foot..	154,086	$2,249.67	50.011	$0.730
Wire, No. 10....pounds..	2,034	76.27	.660	.025
Nails, wire....	19,415	708.78	6.301	.230
Treenails....number..	30,508	72.23	9.902	.023
Brush and poles....cord..	3,211	9,230.01	1.042	2.995
Coal....tons..	5	30.00	.002	.009
Oil....	....	27.33	....	.009
Miscellaneous expenses....	....	504.51	....	.163
Subsistence....	....	3,626.40	....	1.112
Steamboat expenses....	....	728.00	....	.236
Labor....	....	6,024.79	....	1.955
Supervision....	....	253.66	....	.082
Total field cost....	....	23,531.65	....	....

BALLASTING AND SINKING.

Items.	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization....	....	$193.00	....	....
¾-inch strand....pounds..	600	57.00	0.194	$0.018
Lumber....foot..	4,000	58.60	1.298	.019
Wire, No. 10....pounds..	1,500	65.70	.487	.021
Nails, wire....	3,000	113.25	.973	.037
Clips, ½-inch....number..	20	6.60	.006	.002
Stone....tons..	2,786.27	5,989.87	.904	1.944
Rope, manila....pounds..	11,121	3,447.69	3.609	1.119
Miscellaneous expenses....	....	763.17	....	.247
Subsistence....	....	1,068.74	....	.347
Steamboat expenses....	....	1,723.00	....	.559
Labor....	....	2,492.50	....	.809
Supervision....	....	250.00	....	.082
Total field cost....	....	16,229.12	....	....

GRADING (280 SQUARES).

Items.	Total quantity.	Total cost.	Quantity.	Cost.
Subsistence....	....	$1,346.84	....	$4.800
Steamboat expenses....	....	380.00	....	1.360
Labor....	....	3,429.52	....	12.250
Supervision....	....	168.00	....	.600
Total field cost....	....	5,324.36	....	....

PAVING, ROCK AND CONCRETE (280 SQUARES).

Items.	Total quantity.	Total cost.	Quantity.	Cost.
Cement....sacks..	900	$447.00	3.214	$1.704
Sand and gravel....cubic yards..	349	293.00	1.246	1.047
Subsistence....	....	188.99	....	.675
Steamboat expenses....	....	429.00	....	1.532
Labor....	....	916.55	....	3.273
Supervision....	....	55.00	....	.197
Total field cost....	....	2,359.54	....	....

GRAND BAY (808 R), FOURTH DISTRICT—continued.

Summary of costs (1,030 linear feet revetted).

	Subaqeous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.[1]	Total.		
Total field costs	$12.935	$39,760.77	$27.09	$7,683.90	$47,444.67	$46.062
Office expenses	1.292	3,981.96	3.096	867.01	4,848.97	4.707
Surveys [2]	.110	339.39	.264	73.89	413.28	.401
Care of plant [3]	.337	1,038.00	.717	221.01	1,264.03	1.227
Repair of plant	1.431	4,409.67	3.429	960.16	5,369.83	5.213
Depreciation of plant [4]	.919	2,832.01	2.192	613.79	3,445.80	3.345
Total		52,361.80		10,419.76	62,786.58	

[1] Cost per square completed upper bank work.

[2] This item includes actual cost of survey work done on this revetment.

[3] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[4] Depreciation in to be taken at 6 per cent of first cost per annum for all plants with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of fiscal year.—A total of 3,180 linear feet of bank is revetted with mattresses 400 feet wide, and a pavement of rock and concrete extending to the top of the bank. Over the stretch thus protected the bank has been made reasonably permanent and the dikes across Grand Bay and Hermitage (lower end of False River) preserved. So far as is known at this time the work is in good condition. The project is about 40 per cent completed. The total expenditures on existing project were $142,565.51 for new work and $65,540.18 for maintenance, making a total of $208,105.69.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate and deepen the channel, to protect the banks of the river and preserve the dikes across the lower end of False River.

Proposed operations.—It is proposed to make such repairs as may be necessary to preserve the continuity of the existing revetment, widening it where the channel of the river has destroyed the outer edge of the mats, and making such extensions as the available funds and the supply of labor may permit.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $208,105.69:

New work	$142,565.51
Maintenance	65,540.18
Net total expended	208,105.69
Total appropriations to June 30, 1918	323,671.62

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [1]				$142,565.51	
Expended for maintenance [1]					$65,540.18
Total expended [1]				142,565.51	65,540.18
Appropriated or allotted				175,000.00	150,671.62

[1] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended	$32,434.49
Amount appropriated by sundry civil act approved June 12, 1917	150,671.62
	183,106.11
June 30, 1918, amount expended during fiscal year[1] for maintenance	65,540.18
July 1, 1918, balance unexpended	117,565.93
July 1, 1918, outstanding liabilities covered by uncompleted contracts	137.10
July 1, 1918, balance available for maintenance	117,428.83
Amount available for fiscal year ending June 30, 1919	117,428.83
Amount (estimated) required to be appropriated for completion of existing project	[2] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920	[2] Indeterminate.

(*g*) *Plaquemine, La.*

Location and description.—Eight hundred and fifty-four miles below Cairo, right bank.

Original condition.—Caving in this bend has been in progress from an early date, probably for 100 years or more, but the exact date is unknown. The caving has destroyed a considerable portion of the town of Plaquemine, together with several lines of levee and threatened the Government lock at the head of Bayou Plaquemine. The bend was peculiar, inasmuch as caves or subsidence of enormous extent occurred at intervals without warning.

Previous projects.—The work originated under the river and harbor act of August 11, 1888, which provided for "securing a navigable channel 60 feet wide and 6 feet in depth, from deep water up to Plaquemine Dike, and for securing the mouth of the bayou from further caving." The project provided for the construction of four submerged sloping spur dikes of brush and stone, placed at intervals of about 1,000 feet. In 1893, the project was modified to provide for continuous revetment of the bank with mattresses of willow brush. Up to 1902, five spur dikes had been constructed and the intervals between extensively mattressed, at a cost of $258,516.22. Operations were suspended until 1911, when the Mississippi River Commission assumed charge of the work.

Existing project.—The project adopted in 1911 provides for a continuous standard revetment of the bank in front of the Government lock and the town of Plaquemine with mattresses 400 feet wide, together with upper-bank grading and paving.

Operations and results during fiscal year.—The projected work for the past season was to restore the upper end of the work which had been destroyed by a franking cave, and to make extensive repairs to the revetment in the vicinity of the Government lock. The work was prosecuted by day labor with Government-owned plant. Mattress construction was commenced August 23, 1917, and all work practicable with the funds available was completed November 24, 1917. In all 10,900 squares of mattress, covering 2,980 linear feet of bank, were sunk, nearly all of the mattresses being 400 feet wide. The upper bank was graded and paved over an area of 1,029 squares covering a distance of 1,250 linear feet. The upper end of the revetment has been entirely restored for a distance of 650 feet; a cave near section 43 has been repaired for a length of 570 feet; and from a point about 200 feet above section 46 to below section 50, a distance of 1,760 feet, repair work has been continuous. Before the work here outlined had been completed the allotment for this locality was exhausted and operations were suspended.

All of the work was done for the maintenance of existing revetment. A total of 10,900 squares of mattress were placed, covering 2,980 linear feet of bank, and the upper bank was graded and paved over 1,029 squares, covering a distance of 1,250 linear feet.

The total cost of the work done was $101,670.02 for maintenance. The field cost amounted to $100,683.89, and the actual money expended $75,793.79, the difference being due to credits for material on hand and purchased and paid for from allotment for general repairs and stone. The detailed cost of this work is set forth in the accompanying tables.

---

[1] Not deducting receipts from sales, etc.

[2] Exclusive of available funds.

PLAQUEMINE, LA., REVETMENT (854 R.), FOURTH DISTRICT.

Mattresses, total area, 10.748 squares.

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$560.64	....	$0.052
Lumber....feet	542.430	7,944.86	50.468	.738
Wire, No. 10....pounds	7.094	266.02	.660	.025
Nails, wire	73.519	2,212.32	6.840	.205
Treenails....number	106.400	246.66	9.898	.023
Brush and poles....cords	11.200	19,249.44	1.041	1.691
Coal....tons	7	44.00	.006	.004
Oil	....	22.00	....	.002
Miscellaneous expenses	....	456.81	....	.042
Subsistence	....	5,317.77	....	.495
Steamboat expenses	....	2,968.00	....	.276
Labor	....	9,462.51	....	.880
Supervision	....	1,403.66	....	.130
Total field cost	....	50,154.69	....	....

BALLASTING AND SINKING.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$524.77	....	$0.049
⅜-inch strand....pounds	1,200	114.00	0.112	.0107
Lumber....feet	20,000	293.00	1.861	.0273
Wire, No. 10....pounds	2,800	122.64	.261	.0114
Nails, wire	4,100	151.70	.381	.0141
Clips, ⅜-inch....number	40	13.20	.0037	.0012
Stone....tons	8,179.87	17,963.99	.761	1.671
Rope, manila....pounds	9,815	3,042.69	.913	.283
Coal....tons	8	48.00	....	.004
Oil	....	24.00	....	.002
Miscellaneous expenses	....	574.08	....	.053
Subsistence	....	2,926.88	....	.272
Steamboat expenses	....	2,544.00	....	.237
Labor	....	7,238.07	....	.673
Supervision	....	1,167.00	....	.109
Total field cost	....	36,748.02	....	....

Grading (1,029 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Subsistence	....	$1,029.07	....	$1.000
Steamboat expenses	....	418.00	....	.406
Labor	....	3,593.79	....	3.492
Supervision	....	554.58	....	.539
Total field cost	....	5,595.44	....	....

Paving, rock and concrete (1,029 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Stone....tons	2,820.47	$6,193.75	2.741	$6.019
Subsistence	....	176.27	....	.171
Steamboat expenses	....	456.00	....	.443
Labor	....	1,178.39	....	1.145
Supervision	....	180.57	....	.175
Total field cost	....	8,184.98	....	....

Summary of costs (3,020 linear feet revetted).

	Subaqeous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.[1]	Total.		
Total field cost	$8.085	$86,902.71	$13.392	$13,780.42	$100,683.13	$33.334
Office expenses	.079	851.82	.131	135.07	986.89	.326
Surveys [2]	.025	267.00	.052	53.84	320.84	.106
Care of plant [3]	.500	5,361.00	.826	850.11	6,211.11	2.056
Repair of plant	.120	1,278.54	.186	191.35	1,469.89	4.860
Depreciation of plant [4]	.320	3,440.44	.530	545.56	3,986.00	1.320
Total		98,101.51		15,556.35	113,657.86	

[1] Cost per square completed upper bank work.

[2] This item includes actual cost of survey work done on this revetment.

[3] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[4] Depreciation in to be taken at 6 per cent of first cost per annum for all plants with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls. In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Condition at end of fiscal year.—This revetment is 6,370 feet long. The upper bank has caved in several places and the subaqueous bank in many more. The Government lock and much of the town of Plaquemine have so far been preserved. The most essential repairs have been made, but other extensive repairs are still needed.

The total expenditure on the existing project has been $189,688.32 for new work and $114,490.65 for maintenance, making a total of $304,178.97.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate, and deepen the channel, to protect the banks of the river, and to preserve the Government lock and the town of Plaquemine, La.

Proposed operations.—It is proposed to make such repairs as may be necessary to preserve the continuity of the existing revetment, widening it where the channel of the river has destroyed the outer edge of the mats, and making such extensions as the available funds and the supply of labor may permit.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $304,178.97:

New work	$189,688.32
Maintenance	114,490.65
Net total expended	304,178.97
Total appropriations to June 30, 1918	[1] 304,178.97

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [2]	$35,738.53	$33,639.83	$26,566.92		
Expended for maintenance [2]		7,897.59	24,590.33	$1,859.85	$75,793.79
Total expended [2]	35,738.53	41,537.42	51,157.25	1,859.85	75,793.79
Appropriated or allotted	50,000.00	28,385.18		75,793.79	

[1] Total amount, $305,793.79; $1,614.82 transferred to first and second Mississippi River district.

[2] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended	$1,614.82
Amount appropriated by sundry civil act approved June 12, 1917	75,793.79
	77,408.61
Deduction on account of transfer to first and second Mississippi River district	1,614.82
	75,793.79
June 30, 1918, amount expended during fiscal year[1] for maintenance	75,793.79
Amount (estimated) required to be appropriated for completion of existing project	[2] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920	[2] Indeterminate.

(h) *Harbor at New Orleans, La.*

Location and description.—Nine hundred and sixty-five miles below Cairo, right and left banks.

Original condition.—As far back as authentic records exist, the river banks in the concave bends of the river comprised in New Orleans Harbor have been caving, destroying wharves, levees, railroad terminals, and other works of public improvement, thus obstructing commerce.

Previous projects.—In 1878 a mixed board of Army and civil engineers was convened to examine and report on the means necessary to protect the wharves and harbor from the incursions of the river. By act of June 18, 1878, Congress made an appropriation to begin the work. The approved project contemplated the protection of the caving banks in the third district reach with matresses constructed of fish-pole cane. Work was prosecuted until September 29, 1881, when the project was definitely abandoned, after an expenditure of $114,564.72.

Existing project.—The act of August 2, 1882, placed the work under the supervision of the Mississippi River Commission, which, on September 18, 1882, adopted a project providing for the protection of the caving bank in the Carrollton Bend wth continuous matresses of willow brush. In 1884 the project was modified to provide, in addition, for submerged sloping spur dykes of brush and stone, and the scope of the work was extended to cover the Gouldsboro Bend. In 1889 the work was extended to cover the Greenville Bend and the third district reach. The present project, as modified, provides for both spur dikes and continuous mattress revetment.

Operations and results during fiscal year.—The projected work for the past year was to continue revetment work in the Greenville Bend, to repair the work in the Gouldsboro and Carrollton Bends, and the third district reach. Because of delays incident to construction and delivering 3,600 squares of mattress for work at the head of South Pass, revetment work in New Orleans Harbor could not be commenced until the river had risen so that the subsequent progress was necessarily very slow and it was further delayed by unprecedented shortage of labor. Work was prosecuted by day labor with Government owned plant. Mattress construction was commenced February 23, 1918, and sinking of mattresses was commenced April 3, 1918; both were continued until date of this report. The first work undertaken was the widening and extension of the revetment in Carrollton Bend, where the controlling levee is threatened. Here 2,650 squares of mattresses were placed and the revetment extended upstream 400 linear feet. In the third district reach 3,200 squares of mattresses were placed, prolonging the finished revetment downstream 750 linear feet.

A considerable portion of the work, consisting of 1,450 squares of mattress, covering 590 linear feet of bank, was for the maintenance of existing revetment; the remainder, 4,400 squares, covering 1,035 linear feet, was new work. In all 6,150 squares of mattress, covering 1,625 linear feet of bank, was placed. The total cost of the work was $95,580.29, of which $60,865.25 was for new work and $34,714.94 for maintenance. The field cost amounted to $87,437.08 and the actual money expended was $79,597.60 of which $50,687.60 was expended for new work and $28,910 for maintenance, the difference being due to credits for material on hand and purchased and paid for and now on hand. The detailed cost is set forth in the accompanying tables.

---

[1] Not deducting receipts from sales, etc.

[2] Exclusive of available funds.

HARBOR AT NEW ORLEANS, LA., (965 R. AND L.), FOURTH DISTRICT.

Mattresses, total area 6,450 squares.

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$1,256.00	....	$0.195
Lumber .... foot..	326,500	5,866.63	50.620	.909
Wire No. 10 .... pounds..	4,257	159.64	.660	.024
Nails, wire	44,117	1,612.31	6.839	.250
Treenails	63,855	148.03	9.900	.023
Brush and poles .... cord..	6,721	20,016.55	1.042	3.103
Coal .... tons..	20	120.00	....	.019
Oil	....	55.65	....	.008
Miscellaneous expenses	....	2,599.96	....	.403
Subsistence	....	4,276.56	....	.663
Steamboat expenses	....	2,296.00	....	.356
Labor	....	9,101.34	....	1.429
Supervision	....	1,761.99	....	.273
Total field cost	....	49,270.66	....	....

BALLASTING AND SINKING.

Items.	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization	....	$602.00	....	$0.103
⅜-inch strand .... pounds..	3,000	285.00	0.513	.048
Wire No. 10 .... do....	5,000	219.50	.854	.037
Nails, wire	4,700	177.36	.803	.030
Clips, ½-inch .... number..	50	16.50	.008	.002
Stone .... tons..	4,427.13	8,016.29	.756	1.370
Rope, manila .... pounds..	26,335	8,164.00	4.502	1.395
Coal .... tons..	25	150.00	.004	.025
Oil	....	72.00	....	.012
Miscellaneous expenses	....	1,865.17	....	.319
Subsistence	....	2,656.86	....	.454
Steamboat expenses	....	6,934.00	....	1.185
Labor	....	8,135.18	....	1.391
Supervision	....	872.56	....	.149
Total field cost	....	38,166.42	....	....

Summary of costs (1·626 linear feet revetted).

	Subaqueous work.		Total cost per linear foot.
	Per square.	Total.	
Total field cost	$14.217	$87,437.08	$53.774
Office expenses	1.324	8,143.21	5.007
Surveys [1]	.039	244.52	.150
Care of plant [2]	.422	2,597.00	1.597
Repair of plant	1.913	11,769.49	7.238
Depreciation of plant [3]	1.236	7,604.89	4.677
Total	....	117,796.19	....

[1] This item includes actual cost of survey work done on this revetment.

[2] Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.

[3] Depreciation is to be taken at 6 per cent of first cost per annum for all plants with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls; and 4 per cent for all plant with steel hulls.

In distributing plant charges among the various works there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Data of cost of revetment July 1, 1917, to June 30, 1918.

Location.	Expended as per financial statement.	Debits to material on hand.	Credited by material on hand.	Total field cost.	Unit field cost.		Unit overhead cost.		Work accomplished.		Total cost of work.	Gross unit cost.[1]		Remarks.
					Per square.	Per linear foot.	Per square	Per linear foot.	Squares.[2]	Linear feet.		Per square.	Per linear foot.	
Hard Times..........	$8,036.37	$18,113.11	$16,512.80	$5,423.07	....	....	....	....	....	....	$7,485.74	....	....	No work done other than surveys. Pro rata of equipment, etc., charged. Material belonging to Hard Times to value of $2,750.88 was used by Kempe Bend.
Bondurant Chute...	42,310.97	4,543.00	....	56,412.82	$13.074	$40.295	$0.189	$0.584	4,315	1,400	57,231.16	$13.263	$40.879	All repair work. Treasury settlement of $6,927.15 for freight on rock was accounted for in last report. Bills to value of $12,986.05 for Bondurant Chute were charged to general repairs and stone. Rock to value of $5,318.29 belonging to general repairs and stone used. Rock belonging to Bondurant Chute to value of $1,000 was used on levee.
Kempe Bend.........	128,790.29	13,723.15	....	147,715.33	8.309	37.876	.147	.668	17,777	3,900	150,324.76	8.456	38.544	Repair work. Rock belonging to general repairs and stone to value of $5,060.44 used. Material belonging to Hard Times to value of $2,750.88 used.
Giles Bend..........	52,917.87	3,894.21	....	49,854.97	13.402	59.849	1.653	7.384	3,720	833	56,005.34	15.055	67.233	Repair work; $6,759.20 included in financial statement was spent for maintenance of Cowpen Neck Levee. Rock belonging to general repairs and stone to value of $4,683.66 was used for sinking, and rock to value of $1,268.80 belonging to Grand Bay was used for sinking.
Marengo Bend......	46,269.48	565.95	15,008.93	30,889.91	11.135	32.515	1.071	3.126	2,774	950	33,859.58	12.206	35.641	Rock belonging to general repairs and stone to value of $2,033.08 used.
Natchez Front......	3,100.12	....	....	2,388.03	....	....	....	....	....	....	3,100.12	....	....	No work done other than surveys. Pro rata of equipment, etc. charged.
Grand Bay..........	[3]65,540.18	[3]23,044.87	28,340.34	47,857.95	14.239	46.464	1.443	4.707	3,361	1,030	52,706.92	15.682	51.171	
Plaquemine.........	[4]75,733.79	[4]4,194.07	5.94	101,003.13	7.887	33.44	.077	.326	12,806	3,020	101,990.02	7.964	33.771	
New Orleans, La....	[5]79,597.60	[5]15,588.90	1.46	87,681.60	14.257	53.924	1.324	5.008	6,150	1,626	95,824.81	15.581	58.932	

[1] Includes every item of field and overhead charges.

[2] Squares include both subaqueous and upper bank work.

[3] $7,537.79 due from other disteicts.

[4] $22,008.10 was expended from the allotment for general repairs and stone.

[5] $639.77 was expended from the allotment for gerenal repairs and stone.

Condition at end of fiscal year.—A total of 56,750 linear feet of bank has been protected by continuous mattress revetment, by submerged sloping spur dikes in conjunction with continuous mattresses and by spur dikes alone. Where thus protected, the banks have been rendered reasonably permanent, and the destruction of wharves, railroad inclines, and other commercial facilities has been prevented. About 75 per cent of the project has been completed. There remains about 5,000 linear feet of bank to be revetted and the intervals between the spur dikes in the Gouldsboro Bend require to be covered with continuous mattress. Surveys over completed work indicate that considerable scour has occurred where mattresses were placed, and of the river bed beyond them. While no serious caving has occurred, it is considered to be threatened at several localities.

The total expenditures on existing project were $2.034.711.18 for new work and $253,361.07 for maintenance, making a total of $2.288.072.25.

Local cooperation.—The city of New Orleans undertook to protect the bank in the third district reach and expended $327,417.04 for this purpose. The State of Louisiana through the board of commissioners of the port of New Orleans, has expended $10,000,000 for the construction of wharves and other terminal facilities. The funds expended were obtained by the sale of bonds and by local taxation.

Terminal facilities.—There are 39.5 miles of river frontage in the harbor of New Orleans available for shipping. There are 5 miles of wharves, of which 3.5 miles are covered with steel sheds to protect and store merchandise. The wharves are substantially built of creosoted timber. The public wharves are under the control of the board of commissioners of the port of New Orleans since May, 1901. The physical connection with practically all the water terminals is by means of a belt railroad owned and operated by the city of New Orleans and which generally serves all water terminals, immediately in the rear of the sheds and connects with all railroads. All terminal facilities are open to the public.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate, and deepen the channel to protect the banks of the river, and the commercial terminal facilities of the harbor have been rendered reasonably permanent.

Proposed operations.—It is proposed to make such repairs as may be necessary to preserve the continuity of the existing revetment, widening it where the channel of the river has destroyed the outer edge of the mats, and making such extensions as the available funds and the supply of labor may permit.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918 after deducting receipts from sales, etc., amounting to $2.288,072.25:

New work	$2,034,711.18
Maintenance	253,361.07
Net total expended	2,288,072.25
Total appropriations to June 30, 1918	[1] 2,477,709.16

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [2]	$42,525.01	$59,060.74	$42,813.92	....	$50,687.60
Expended for maintenance [2]	2,000 00	2,827.93	12,585.85	$22,420.85	28,910.00
Total expended [2]	44,525.01	61,888.67	55,399.77	22,420.85	79,597.60
Appropriated or allotted	50,000.00	24,664.91	130,000.00	150,000.00	....

---

[1] Total amount $2,498,044.25; $20,335.09 transferred to first and second Mississippi River districts.

[2] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended		$132, 267. 57
Amount appropriated by sundry civil act approved June 12, 1917		150, 000. 00
		282, 267. 57
Deduction on account of transfer to first and second Mississippi River districts		20, 335. 09
		261, 932. 48
June 30, 1918, amount expended during fiscal year [1]—		
For new work	$50, 687. 60	
For maintenance	28, 910. 00	
		79, 597. 60
July 1, 1918, balance unexpended		182, 334. 88
July 1, 1918, outstanding liabilities		34, 056. 11
July 1, 1918, balance available for maintenance		148, 278. 77
Amount available for fiscal year ending June 30, 1919		148, 278. 77
Amount (estimated) required to be appropriated for completion of existing project		[2] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920		[2] Indeterminate.

(*i*) *General repairs and stone.*

Location and description.—The general character of operations under this allotment renders it impracticable to give data as to location and description.

Original condition.—The general character of operations under this allotment renders it impracticable to give data as to original condition.

Previous projects.—None.

Existing project.—The allotment is intended to cover unforeseen contingencies on the several works throughout the district and the purchase of stone, principally ballast reaching the harbor of New Orleans in vessels engaged in foreign trade.

Operations and results during fiscal year.—The diversified character of operations under this allotment renders it impracticable to give data as to location, original condition, previous and present projects, etc.

The allotment is intended to cover unforeseen contingencies on the several works throughout the district and the purchase of stone. The work comes under the general project for improving the Mississippi River. An allotment of $34,632.37 was made during the present year, and there was a balance on hand of $18,387.24 from previous allotment.

During the period covered by this report $45,253.73 has been expended for the operation of the dredge *The Ram* in dredging gravel for making ballast, for the purchase of ships' ballast in New Orleans Harbor, for the making of concrete ballast, for repairs to revetment work at Plaquemine, Kempe Bend, and Bondurant Chute, and for administration.

Conditions at end of fiscal year.—The allotment is intended to cover unforeseen contingencies on the works throughout the district and the purchase of stone. The funds allotted were expended for the purpose stated. The total amount expended on the existing project has been $39,318.27 for new work and $100,548.22 for works of maintenance.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The allotment has been beneficial to all the revetment work of the district in securing ballast at bargain prices.

Proposed operations.—Purchase of stone, manufacture of ballast, and emergency repair work.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

---

[1] Not deducting receipts from sales, etc.

[2] Exclusive of available funds.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $139,866.49:

New work	$39, 318. 27
Maintenance	100, 548. 22
Net total expended	139, 866. 49
Total appropriations to June 30, 1918	[1] 143, 059. 19

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [2]	$12,099.56	$15,175.65	$12,043.06		
Expended for maintenance [2]	4,941.96	1,028.13		$24,418.05	
Total expended [2]	17,041.52	16,203.78	12,043.06	24,418.05	$45,253.73
Appropriated or allotted	20,000.00	20,425.82	23,000.00	34,632.37	

July 1, 1917, balance unexpended	$18, 387. 24
Amount appropriated by sundry civil act approved June 12, 1917	34, 632. 37
	53, 019. 61
Deduction on account of transfer to first and second Mississippi River districts	4, 574. 18
	48, 445. 43
June 30, 1918, amount expended during fiscal year[1] for maintenance	45, 253. 73
July 1, 1918, balance unexpended	3, 191. 70
July 1, 1918, outstanding liabilities	46. 75
July 1, 1918, balance available for maintenance	3, 144. 95
Amount available for fiscal year ending June 30, 1919	3, 144. 95
Amount (estimated) required to be appropriated for completion of existing project	[3] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920	[3] Indeterminate.

II. LEVEES.

General.—All levees are being constructed to the grade and section fixed by the Mississippi River Commission by resolution adopted April, 1914, which provides that the grade shall be 3 feet above the deduced confined flood of 1912, with section having a crown 8 feet wide, river slope 3 to 1, land slope 3 to 1 to from 5 to 8 below crown, and thence a banquette of width from 20 to 40 feet, dependent on the height of the levee, with back slope of 4 to 1.

Summary of present condition of levee system.

Name of district.	Total miles in system.	Levees up to grade and section June 30, 1918.	Yardage required to complete.	Yardage new levees needed in next 5 years.	Total.
Lower Tensas	157.50	16.67	12,141,824	3,131,500	15,273,324
Atchafalaya	127.40	18.00	12,500,000	1,150,000	13,650,000
Lafourche	82.30	20.06	2,871,285	1,450,000	4,321,285
Barataria	71.15	38.43	843,201	294,422	1,137,623
Pontchartrain	125.35	18.90	8,463,358	816,342	9,279,700
Lake Borgne	78.13	47.92	626,369	212,416	838,785
Total	641.83	159.98	37,446,037	7,054,680	44,500,717

---

[1] Total amount, $147,632.87; $4,574.18 transferred to first and second Mississippi River districts.

[2] Not deducting receipts from sales, etc.

[3] Exclusive of available funds.

(*a*) *Lower Tensas levee district.*

Location and description.—The lower Tensas levee district extends on right bank, in continuation of the upper Tensas levee district, from a point opposite Warrenton, Miss., 607 miles below Cairo, to the mouth of Red River, 764 miles below Cairo, with a river frontage of 157 miles and an area of 2,080 square miles. The levee line is continuous from the upper end of the district down to Point Breeze, 755 miles below Cairo. The total length of levee line is 157.40 miles, of which 150.45 miles have been built.

Original condition.—Originally, there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

Existing project.—The present project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to a grade 3 feet above the deduced confined flood of 1912, with a section having a crown of 8 feet width, river slope one on three, land slope one on three, to 8 feet below crown, and thence a banquette of varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results during the fiscal year.—There has been added during the year, under contract, 565,189.98 cubic yards, at a total cost of $123,304.25.

The total work done by the United States and local authorities is as follows:

Constructed by the United States	cubic yards	565,190
Constructed by local authorities	do	[1] 355,482
Total constructed during the year	do	920,672
Percentage of work done by the United States	per cent	61.4

The result has been to give added protection against floods. The completed levee line is 16.67 miles in length.

The work under construction and the progress thereon is shown in the following table and has resulted in increased protection against floods.

---

[1] Does not include 11,673 cubic yards placed on old levee at Clagett, not the controlling line.

Lower Tensas levee district.

Name of levee.	Kind of work.	Miles below Cairo.	Length.	Average height.	In contract.
			Feet.	*Feet.*	*Cubic yards.*
Dunn	New and enlargement	611.5 R.	3,700	21.6	101,969.56
Hodge	Enlargement	613.5 R.	4,493	22.1	89,952.14
Hunter	do	614 R.	3,600	24.6	87,702.67
Diamond Island	do	614.5 R.	3,300	24.9	91,426.46
Shelulah	do	615 R.	4,300	25.1	106,676.81
Bayou Roundaway	do	616 R.	7,900	16.1	91,015.70
Loyd	do	631 R.	12,010	19.3	205,653.21
Elk Ridge, lot 1	do	631.5 R.	5,555	25.4	167,349.57
Elk Ridge, lot 2	do	631.5 R.	5,717	26.9	173,407.83
White Oak Lake	do	630-2 R.	17,186	21.0	51,235.50
Hard Times	do	635-8 R.	11,223	22.5	274,684.45
Winter quarters, 1	do	638-9 R	6,663	26.2	199,522.34
Winter quarters, 2	do	639-40 R.	7,207	23.6	211,061.25
Botany Bay, lot 1	do	641 R.	7,150	22.6	193,671.72
Botany Bay, lot 2	do	642 R.	7,800	22.3	200,305.37
Botany Bay, lot 3	do	643 R.	8,460	21.0	198,696.21
Kempe	New and enlargement	656 R.	4,328	23.0	173,953.08
		....	....	....	2,618,303.87

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	Cubic yards.	*Cubic yards.*	*Cents.*		*Cubic yards.*
Dunn	26,792.85	23,074.48	14.99	$3,456.56	22,736.56
Hodge	....	....	23.40	....	86,674.58
Hunter	71,189.50	79,732.99	20.90	16,664.19	....
Diamond Island	....	....	24.70	....	91,426.46
Shelulah	20,963.59	16,222.98	25.70	4,169.31	85,713.23
Bayou Roundaway	27,771.90	41,432.01	16.40	6,794.85	....
Loyd	90,505.61	62,895.10	29.00	18,239.46	115,147.60
Elk Ridge, lot 1	167,349.57	132,781.12	27⅞	37,012.74	....
Elk Ridge, lot 2	56,298.00	10,171.81	27⅞	2,835.39	117,109.83
White Oak Lake	17,984.25	18,021.25	42.90	7,731.12	....
Hard Times	....	....	27.96	....	274,684.45
Winter quarters, 1	....	....	27.96	....	199,522.34
Winter quarters, 2	....	....	27.96	....	211,061.25
Botany Bay, lot 1	....	....	27.96	....	193,671.72
Botany Bay, lot 2	....	....	27.96	....	200,305.37
Botany Bay, lot 3.2	....	....	27.96	....	198,696.21
Kempe	86,334.71	83,811.55	31,50	26,400.63	87,618.37
	565,189.98	408,143.29	....	123,304.25	1,881,367.96

Work on various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work finished.	Remarks.
Dunn	611.5 R.	May 24, 1916	....	Under construction.
Hodge	613.5 R.	June 10, 1916	....	Work suspended.
Hunter	614 R.	Aug. 14, 1915	Nov. 21, 1917	
Diamond Island	614.5 R.	....	....	Not begun.
Shelulah	615 R.	July 21, 1917	....	Work suspended.
Bayou Roundaway	616 R.	Oct. 28, 1915	Aug. 11, 1917	
Loyd	631 R.	Jan. 1, 1918	....	Under construction.
Elk Ridge, lot 1	631.5 R.	Dec. 15, 1917	June 25, 1918	
Elk Ridge, lot 2	631.5 R.	Jan. 1, 1918	....	Do.
White Oak Lake	630-32 R.	Nov. 16, 1916	Oct. 5, 1917	
Hard Times	635-38 R.	May 25, 1918	....	Preparatory work.
Winter quarters, lot 1	638-39 R.	do	....	Do.
Winter quarters, lot 2	639-40 R.	do	....	Do.
Botany Bay, lot 1	641 R.	do	....	Do.
Botany Bay, lot 2	642 R.	do	....	Do.
Botany Bay, lot 3	643 R.	do	....	Do.
Kempe	656 R.	Oct. 21, 1917	....	Work suspended.

Contracts in force.

Name of contractor.	Amount of work.	Character of work.	Unit price.	Date of approval.
	Cubic yards.		*Cents.*	1915.
E. H. Jackson	101,989.56	New and enlargement	14.98	Nov. 13
W. C. Mullen	89,952.14	Enlargement	23.40	...do....
Do	91,426.46	.....do	24.70	...do....
Do	106,676.81	.....do	25.70	...do....
Forest Construction Co	205,653.21	.....do	29.00	1918. Jan. 12
Helgason, Bros	167,349.57	.....do	27⅞	1917. Dec. 1
Do	173,407.83	.....do	27⅞	...do....
Dameron-White Co. (Ltd.)	274,684.45	.....do	27.96	1918. Jan. 16
Do	199,522.34	.....do	27.96	...do....
Do	211,061.25	.....do	27.96	Do.
Do	193,671.72	.....do	27.96	Do.
Do	200,305.37	.....do	27.96	Do.
Do	198,696.21	.....do	27.96	Do.
Francis T. Constant	173,953.08	New and enlargement	31.50	1916. Nov. 20
	2,388,350.00			

Name of contractor.	Date of beginning.	Date of expiration.	Percentage complete.	Name of levee.	Miles below Cairo.
	1915.	1916.			
E. H. Jackson	Oct. 13	Dec. 15	77.6	Dunn	611.5 R.
W. C. Mullen	Oct. 12	...do...	3.6	Hodge	613.5 R.
Do	...do...	...do...		Diamond Island	614.5 R.
Do	...do...	...do...	19.6	Shelulah	615 R.
	1918.	1918.			
Forest Construction Co	Jan. 28	Dec. 31	44.0	Loyd	631 R.
Helgason Bros	Jan. 23	...do...	100.0	Elk Ridge, lot 1	631.5 R.
Do	...do...	...do...	32.4	Elk Ridge, lot 2	631.5 R.
Dameron-White Co. (Ltd.)	Feb. 2	...do...		Hard Times	635–8 R.
Do	...do...	...do...		Winter quarters, lot 1	638–9 R.
Do	...do...	...do...		Winter quarters, lot 2	639–40 R.
Do	...do...	...do...		Botany Bay, lot 1	641 R.
Do	...do...	...do...		Botany Bay, lot 2	642 R.
Do	...do...	...do...		Botany Bay, lot 3	643 R.
	1916.				
Francis T. Constant	Nov. 15	Jan. 5	45.8	Kempe	656 R.

Condition at end of fiscal year.—The following is the condition of the levee at the end of the fiscal year (June 30, 1918):

Project for earthwork	per cent completed	69.2
Miles in system		157.45
Miles built		150.50
Yardage lost during the year		273.863
Contents of levee June 30, 1918	cubic yards	31,598,752
Required to bring levee to grade and section	do[1]	12,141,824
Required to bring levee to grade and section and to construct new levees which will be necessary within the next five years	cubic yards	15,273.324
Miles of levee above highest water:		
Less than 1 foot		6.82
From 1 to 2 feet		19.93
From 2 to 3 feet		55.29
From 3 to 4 feet		26.36
From 4 to 5 feet		16.32
Miles of levee up to grade but deficient in section		9.11
Miles of levee up to full grade and section		16.67

---

[1] Does not include 1,884,368 cubic yards under contract.

Local cooperation.—Local authorities have expended, in part, and between 1882 and January 1, 1918, $3,678,172.10 in building, improving, and maintaining the levee line. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no accurate record of them has been discovered. Under conditions of the flood-control bill (H. R. 14777, 64th Cong.), requiring local interests to contribute "not less than one-half of such sum as may have been allotted by the commission," the fifth Louisiana levee district has contributed, for work under existing project, $157,500.

Terminal facilities.—There are regular landing places at St. Joseph, La. (648.3 R.), and at Fort Adams, Miss. (755 L.), for steamboats plying on the Mississippi River discharging and receiving freight. The physical connection is by teams hauling over the graded banks and approaches over the levees to the water's edge. There are covered warehouses of an elementary type at each of the places to shelter freight, principally cotton and cotton seed, to be shipped and merchandise received for local consumption. The landing places are several miles distant from the settlements which they serve.

Effect of improvement.—The effect of the improvement is to give an increasingly reliable protection against floods. The work can not be allowed to remain without further operations. Complete protection is not yet afforded and any delay may cause serious damage.

Proposed operations.—It is proposed to continue to strengthen the levee line by enlarging weak and low levees to the approved grade and section adopted by the Mississippi River Commission, building new levees to replace those threatened by caving banks, and making minor repairs where necessary.

Recommended modifications of project.—None.

Reference to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $5,375,441:

New work	$4,962,717.50
Maintenance	412,723.50
Net total expended	5,375,441.00
Total appropriations to June 30, 1918	5,899,563.38

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work[1]	$579,918.88	$162,846.41	$150,505.89	$134,487.52	$205,917.80
Expended for maintenance[1]	58,823.97	....	30,316.34	2,343.63	4,087.90
Total expended[1]	638,742.85	162,846.41	180,822.23	136,831.15	210,005.70
Appropriated or allotted	275,000.00	248,000.00	324,000.00	315,612.88	....

[1] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended		$418,813.20
Amount appropriated by sundry civil act approved June 12, 1917		315,612.88
Receipts from sales, etc., during fiscal year 1918		2.00
		734,428.08
June 30, 1918, amount expended during fiscal year:[1]		
For new work	$205,917.80	
For maintenance	4,087.90	
		210,005.70
July 1, 1918, balance unexpended		524,422.38
July 1, 1918, amount covered by uncompleted contracts		524,422.38
Amount (estimated) required to be appropriated for completion of existing project		[2] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920		[2] Indeterminate.

---

[1] Not deducting receipts from sales, etc.

[2] Exclusive of available funds.

Amount contributed for improvement of Mississippi River in lower Tensas levee district.

SPECIAL FUNDS.

Amount contributed (for expenditure in the lower Tensas levee district, by the board of commissioners, fifth Louisiana levee district	$157,500
Amount covered by uncompleted contracts	157,500

(*b*) *Atchafalaya levee district.*

Location and description.—The Atchafalaya levee district extends on the right bank of the Mississippi River from Red River, 764 miles below Cairo, to Bayou Lafourche, 886 miles below Cairo, with a river frontage of 122 miles and an area of 6,035 square miles. The levee line is continuous and is 127.35 miles in length, all of which has been built.

Original condition.—Originally there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

Existing project.—The present project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to a grade 3 feet above the deduced confined flood of 1912, with a section having a crown of 8 feet width, river slope one on three, land slope one on three to 8 feet below crown, and thence a banquette of varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results during the fiscal year.—There has been added during the year, under contract and by hired labor, 1,242,150.21 cubic yards at a total cost of $151,486.18.

The total work done by the United States and local authorities is as follows:

Constructed by the United States	cubic yards	1,242,150.81
Constructed by local authorities	do	896,723.00
Total constructed during the year	do	2,138,873.81
Percentage of work done by the United States	per cent	58.1

The result has been to give added protection against floods. Eighteen miles of levee have been completed to grade and section.

The work under construction and the progress thereon is shown in the following tables, and has resulted in increased protection against floods:

Name of levee.	Kind of work.	Miles below Cairo.	Length.	Average height.	In contract.
			Feet.	*Feet.*	*Cubic yards.*
Old River	New and enlargement	765 R.	38,575	13.5	527,376.56
Red River Landing	Enlargement	765 R.	7,004	20.9	197,871.90
Smithland	New	766.5 R.	5,095	16.5	244,415.75
Henrietta	do	767.8 R.	9,829	13.9	255,838.44
Batchelor	New and enlargement	772 R.	5,800	19.0	106,623.56
Normandy	Enlargement	773.5 R.	5,700	19.9	104,653.72
Unique	do	775 R.	5,550	18.0	101,616.02
Lacour, lot 2	do	780 R.	2,400	24.5	104,841.73
Foster-Fleta [1]	do	783 R.	12,246		410,189.20
Total					2,053,426.68

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	Cubic yards.	*Cubic yards.*	*Cents.*		*Cubic yards.*
Old River	237,765.13	208,330.22	11.25	$23,941.67	289,611.43
Red River Landing	98,565.34	73,506.76	13.47	9,901.35	99,306.56
Smithland	244,715.75	244,715.45	13.47	32,922.80	
Henrietta	255,862.12	255,838.44	13.47	34,461.44	
Batchelor	59,676.89	63,321.23	9.23	5,844.55	
Normandy	94,956.91	98,002.18	9.23	9,045.60	
Unique	92,263.94	87,819.07	9.23	8,105.70	9,352.08
Lacour, lot 2	11,444.73	13,696.73	11.89	1,628.54	
Foster-Fleta [1]	176,900.00	176,900.00	11.02	19,494.64	233,289.20
Total	242,150.21	1,222,130.08		145,346.29	631,559.27

[1] Work being done by hired labor and United States plant.

Work was done by hired labor and with Government plant as follows:

Machine (B-3)—Foster-Fleta:

Mobilization	$2,353.64
Drainage	112.60
Plowing	184.00
Operation	13,145.33
Repairs	3,597.32
Surveys	101.75
Depreciation	5,833.33
Overhead	306.56
Total cost	25,634.53
Yards handled	176,900
Cost per yard	$0.1449

Work on various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work finished.	Remarks.
Old River	765 R.	Nov. 5, 1917		Under construction.
Red River Landing	765 R.	Mar. 11, 1918		Do.
Smithland	765.5 R.	Sept. 4, 1917	Mar. 10, 1918	
Henrietta	765.8 R.	May 14, 1917	Sept. 6, 1917	
Batchelor	772 R.	Dec. 20, 1916	Oct. 16, 1917	
Normandy	773.5 R.	Mar. 5, 1917	Jan. 10, 1918	
Unique	775 R.	Jan. 11, 1918		Do.
Lacour, lot 2	780 R.	May 18, 1915	Oct. 17, 1917	
Foster Fleta	783 R.	Feb. 20, 1918		Do.

Contracts in force.

Name of contractor.	Amount of work.	Character of work.	Unit price.	Date of approval.
	Cubic yards.		*Cents.*	
Grasser Contracting Co	527,376.56	New and enlargement.	11.25	Dec. 1, 1917
Do	197,871.90	Enlargement	13.47	Nov. 20, 1916
Gibson-Hamilton Co	101,616.02	do	9.23	Nov. 13, 1915

Name of contractor.	Date of beginning.	Date of expiration.	Complete.	Name of levee.	Miles below Cairo.
			P.ct.		
Grasser Contracting Co	Dec. 21, 1917	Dec. 31, 1918	45.1	Old River	765 R.
Do	Apr. 1, 1917	Jan. 31, 1918	49.8	Red River Landing	765 R.
Gibson-Hamilton Co	Nov. 30, 1915	Dec. 15, 1916	90.8	Unique	775 R.

Condition at end of fiscal year.—The following is the condition of the levees at the end of the fiscal year (June 30, 1918):

Project for earthwork, per cent complete	68.5
Miles in system	127.40
Miles built	127.40
Yardage lost during the year, cubic yards	761,214
Contents of levees (June 30, 1918), do	27,124,343
Required to bring levees to grade and section, do	[1] 12,500,000
Required to bring levees to grade and section and to construct new levees which will become necessary in the next 5 years, cubic yards	13,650,000
Miles of levee above highest water:	
Less than 1 foot	10.75
From 1 to 2 feet	38.17
From 2 to 3 feet	21.03
From 3 to 4 feet	19.01
From 4 to 5 feet	None.
Miles of levee up to grade but deficient in section	20.44
Miles of levee up to full grade and section	18.00

Local cooperation.—Local authorities have expended, in part, and between 1882 and January 1, 1918, $10,672,949.39 in building, improving, and maintaining levee lines. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no account of them has been discovered. Under conditions of the flood-control bill (H. R. 14777, 64th Cong.), requiring local interests to contribute "not less than one-half of such sum as may have been allotted by the commission," the Atchafalaya Basin Levee Board has contributed for work under existing project $65,000.

Terminal facilities.—There are landing places at almost every plantation in this district to receive and discharge freight for local consumption. The physical connection with these landing places is by means of teams over earth roads and ramps over the levees and graded approaches to the landing places at the water's edge. At all these landings are covered warehouses of an elementary type to shelter freight received and shipped. All these places are also served by the Texas & Pacific Railroad passing in the rear of from 1 to 6 miles distant. The parishes in this district are now engaged in building good roads which will effectively serve water terminals throughout the district. The principal water terminals in the district having storage facilities for receiving and shipping freght are the following, named in order going downstream:

Torras, La. (765. R.).
Red River Landing, La. (766 R.).
Raccourci, La. (785 R.).
Morganza, La. (788.5 R.).
Point Coupee, La. (796 R.).
Cooks, La. (806 R.).

---

[1] Does not include 427,704.98 cubic yards under contract.

Hermitage, La. (808 R.).
Devalls, La. (823 R.).
Port Allen, La. (833 R.).
Plaquemine, La. (852.5 R.).
Bayou Goula, La. (867 R.).
White Castle, La. (868 R.).

Effect of improvement.—The effect of the improvement is to give increasingly reliable protection against floods. The work can not be allowed to remain without further operations. Complete protection is not yet afforded, and any delay may cause serious damage.

Proposed operations.—It is proposed to continue to strengthen the levee line by enlarging weak and low levees to the approved grade and section, adopted by the Mississippi River Commission, building new levees to replace those threatened by caving banks, and making minor repairs where necessary.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $2,363,321.69:
New work — $2, 207, 633. 64
Maintenance — 155, 688. 05

Net total expended — 2, 363, 321. 69

Total appropriations to June 30, 1918 — [1] 2, 532, 186. 99

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [2]	$137,557 26	$66,418 47	$54,058.58	$112,137 69	$33,634.35
Expended for maintenance [2]	1,825 37	....	20,338 66	....	5,620.93
Total expended [2]	139,392 63	66,418 47	74,397.24	112,137.69	139,255.28
Appropriated or allotted	125,000.00	85,000.00	171,075.90	131,373.51	....

July 1, 1917, balance unexpended — $179, 119. 15
Amount appropriated by sundry civil act approved June 12, 1917 — 131, 373. 51

310, 492. 66

Deduction on account of transfer to first and second Mississippi River districts — 2, 372. 08

308, 120. 58

June 30, 1918, amount expended during fiscal year: [2]
For new work — $133, 634. 35
For maintenance — 5, 620. 93
— 139, 255. 28

July 1, 1918, balance unexpended — 168, 865. 30
July 1, 1918, outstanding liabilities — [3] 47, 591. 79
July 1, 1918, amount covered by uncompleted contracts — 121, 273. 51
— 168, 865. 30

Amount (estimated) required to be appropriated for completion of existing project — [4] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920 — [4] Indeterminate.

---

[1] Total amount $2,534,559.07; $2,372.08 transferred to first and second Mississippi River district.
[2] Not deducting receipts from sales, etc.
[3] Part of cost of levee building machine, etc., included.
[4] Exclusive of available funds.

Amount contributed for improvement of Mississippi River in Atchafalaya levee district.

SPECIAL FUNDS.

Amount contributed (for expenditure in the lower Tensas levee district, by the board of commissioners, Atchafalaya Basin levee district)	$65,000
Amount covered by uncompleted contracts	65,000

(c) *Lafourche levee district.*

Location and description.—The Lafourche levee district extends on the right bank from Bayou Lafourche, 886 miles below Cairo, to New Orleans, 964 miles below Cairo, with a river frontage of 78 miles. The Lafourche and Barataria levee districts comprise the same basin with a total area of 2,020 square miles. The levee line is continuous, 82.21 miles in length, all of which has been built.

Original condition.—Originally there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

Existing project.—The present project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time, and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to a grade 3 feet above the deduced confined flood of 1912, with a section having a crown of 8 feet width, river slope 1 on 3, land slope 1 on 3 to 8 feet below crown, and thence a banquette of varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results during the fiscal year.—There has been added during the year, under contract and by hired labor, 1,151,532.40 cubic yards, at a total cost of $141,593.15.

The total work done by the United States and local authorities is as follows:

Constructed by the United States	cubic yards	1,157,532
Constructed by local authorities	do	982,981
Total constructed during the year	do	2,140,513
Work done by the United States	per cent	54

The effect has been to give increased security against floods. The completed levee line is 20.06 miles in length.

The work under construction and the progress thereon is shown in the following tables, and has resulted in increased protection against floods:

Name of levee.	Kind of work.	Miles below Cairo.	Length.	Average height.	In contract.
			Feet.	*Feet.*	*Cubic yards.*
Brilliant Point	New and enlarging	900.5 R.	26,418	15.0	499,280.74
Bon Secour	Enlarging	907.9 R.	7,853	15.5	159,275.55
Pikes Peak	do	910 R.	3,583	17.0	85,248.13
Delogney	do	911.12 R.	11,005	17.1	238,925.56
Wallswood	New and enlarging	952 R.	20,960	17.5	442,532.34
Lower Avondale	Enlarging	955 R.	651	18.5	10,255.32
Fairfield	New	955.5 R.	3,411	18.0	210,114.62
Total					1,457,535.26

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	Cubic yards.	*Cubic yards.*	*Cents.*		*Cubic yards.*
Brilliant Point	290,110 48	290,110.48	12 23	$35,480 51	209,170 26
Bon Secour	55,499 14	55,499 14	12 23	6,787.55	103,676.41
Pikes Peak	85,248 13	85,248.13	12 23	10,425 84	
Delogney	160,077.37	160,077.37	9.95	[1] 15,927.81	79,848.19
Wallswood	346,227.34	346,227 34	10.23	35,419.06	
Lower Avondale	10,255.32	10,255.32	18.00	[1] 1,853.38	
Fairfield	210,114.62	210,114.62	11.42	[1] 23,003.17	
Total	1,157,532.40	1,157,532.40		128,897.32	

[1] Constructed by hired labor.

Work was done by hired labor and with Government plant as follows:

Machine and location.	Mobilization.	Cleaning.	Plowing.	Operation.	Repairs.	Dressing.
B-1. Delogney	$726.69	$285.03	$108.60	$12,326.72	$1,131.16	$1,216.00
B-2. Lower Avondale		64.80	12 00	1,253.22	384.16	118 00
B-2, B-6. Fairfield	3,474.66	469.14	64.00	22,359.28	4,017.93	2,167.36

Machine and location.	Sodding.	Surveys.	Depreciation.	Overhead.	Total cost.	Handled.	Cost per cubic yard.
						Yards.	
B-1. Delogney	$108.00	$25 61	$1,956.00	$631.00	$18,514.81	160,077.37	$0.1157
B-2. Lower Avondale	14.00	7.20	329 00	81 83	2,264.21	10,255.32	.2208
B-2, B-6. Fairfield	124.00	24.80	7,665.00	2,033.00	32,701.17	210,114.62	.1556

Work on various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work completed.
Brilliant Point	900-5 R.	Oct. 17, 1917	(1)
Bon Secour	907-9 R.	May 6, 1918	(1)
Pikes Peak	910 R.	Jan. 23, 1918	Apr. 20, 1918
Delogney	911-12 R.	Mar. 4, 1918	(1)
Willswood	952 R.	Dec. 21, 1916	Jan. 5, 1918
Avondale	955 R.	Nov. 23, 1917	Dec. 7, 1917
Fairfield	955.5 R.	June 1, 1917	June 25, 1918

[1] Under construction.

Contracts in force.

Name of contractor.	Amount of work.	Character of work.	Unit prices.	Date of approval.
	Yards.		*Cents.*	
D. B. Hearin & Son and O. O. Ogden	85,248.13	Enlargement	12.23	Dec. 1, 1917
Do	497,336.90	Enlargement and new	12.23	Do.
Do	164,223.51	Enlargement	12.23	Do.

Name of contractor.	Date of beginning.	Date of expiration.	Completed.	Name of levee.	Miles below Cairo.
			Per ct.		
D. B. Hearin & Son and O. O. Ogden.	Dec. 23, 1917	Dec. 31, 1918	100	Pikes Peak	910 R.
Do	do	do	58	Brilliant Point	900-5 R.
Do	do	do	33	Bon Secour	907-9 R.

Conditions at end of fiscal year.—The following is the condition of the levee at end of the fiscal year (June 30, 1918):

Project for earthwork per cent completed	83.3
Miles in system	82.30
Miles built	82.30
Yardage lost during the year cubic yards	383,581
Contents of levee (June 30, 1918) do	14,391,771
Required to bring levees to grade and section do	2,871,285
Required to bring levees to grade and section and to build new levees which will become necessary in the next five years cubic yards	4,321,285
Miles of levee above highest water:	
Less than 1 foot	0.28
From 1 to 2 feet	8.71
From 2 to 3 feet	13.43
From 3 to 4 feet	17.51
From 4 to 5 feet	None.
Miles of levee up to grade but deficient in section	22.31
Miles of levee up to full grade and section	20.06

Local cooperation.—Local authorities have expended in part, and between 1882 and January 1, 1918, $6,075,018.30 in building, improving, and maintaining levee lines. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no accurate record of them has been discovered. Under conditions of the act of Congress (H. R. 14777, 64th Cong.) requiring local interests to contribute "not less than one-half of such sum as may have been allotted by the commission," the Lafourche levee district has contributed for work under the existing project $42,500.

Terminal facilities.—There are the usual landings for steamboats plying on the Mississippi River in this district for receiving and discharging freight in front of all plantations. As this district is thickly settled, due to its being a sugar-cane growing district, the roads serving the landings are, as a rule, kept in fair condition all the year around. The physical connection between these roads and the landings is by means of teams hauling over earth roads and ramps over the levees and graded approaches to the landing places at the water's edge. The warehouses to shelter freight received and shipped are of an elementary type, but serve well the character of the merchandise handled. This district is also served immediately in the rear by the Texas & Pacific Railroad. The principal water terminals in this district having facilities for receiving and shipping freight are the following named, in order, downstream:

Donaldsonville, La. (885.4 R.).
Lauderdale, La. (898.2 R.).
St. James, La. (905.5 R.).
Hahnville, La. (939.4 R.).
Luling, La. (942.7 R.).
Waggaman, La. (955 R.).

At Avondale, La. (955.8 R.), the Southern Pacific Railroad Co. operates a transfer boat for passengers and freight trains, with the usual terminal facilities of substantial approaches, but no shelter of any kind. This terminal is within the port of New Orleans. Westwego, La. (961.8 R.), is the terminal of the Texas & Pacific Railroad. It has substantially constructed covered warehouses and grain elevators and wharves of creosoted timber, with railroad tracks on the wharves near the water's edge convenient for loading from railroad cars freight direct to outbound seagoing ships.

Effect of improvement.—The effect of the improvement has been to give increasingly reliable protection against floods. Complete protection is not yet afforded and any delay may cause serious damage.

Proposed operations.—It is proposed to continue to strengthen the levee line by enlarging weak and low levees to the approved grade and section adopted by the Mississippi River Commission, building new levees to replace those threatened by caving banks, and making minor repairs where necessary.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $1,166,990.91:

New work	$1, 057, 734. 84
Maintenance	109, 256. 07
Net total expended	1, 166, 990. 91
Total appropriations to June 30, 1918	1, 191, 843. 16

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [1]	$119, 931. 38	$77, 715. 78	$22, 507. 55	$35, 673. 99	$133, 842. 47
Expended for maintenance [1]	1, 009. 07		13, 565. 69		7, 452. 85
Total expended [1]	120, 940. 45	77, 715. 78	36, 073. 24	35, 673. 99	141, 295. 32
Appropriated or allotted	100, 000. 00	25, 000. 00	100, 000. 00	86, 292. 10	

[1] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended		$79, 855. 47
Amount appropriated by sundry civil act approved June 12, 1917		86, 292. 10
		$166, 147. 57
June 30, 1918, amount expended during fiscal year:[1]		
For new work	$133, 842. 47	
For maintenance	7, 452. 85	
		141, 295. 32
July 1, 1918, balance unexpended		24, 852. 25
July 1, 1918, outstanding liabilities	6, 077. 39	
July 1, 1918, amount covered by uncompleted contracts	18, 774. 86	
		24, 852. 25
Amount (estimated) required to be appropriated for completion of existing project		[2] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920		[2] Indeterminate.

---

[1] Not deducting receipts from sales, etc.

[2] Exclusive of available funds.

Funds contributed for improvement of Mississippi River in Lafourche levee district.

SPECIAL FUNDS.

Amount contributed (for expenditure in the Lafourche levee district, by the board of commissioners, Lafourche Basin levee district)	$42, 500
Amount covered by uncompleted contracts	42, 500

(*d*) *Barataria levee district.*

Location and description.—The Barataria levee district extends on the right bank from the lower limits of New Orleans, 981.5 miles below Cairo, to the Head of the Passes, 1.064 miles below Cairo, with a river frontage of 82.5 miles. The levee line is continuous to the Jump, 71.12 miles. The total area protected in this and the Lafourche district is 2,020 square miles.

Original condition.—Originally, there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

Existing project.—The present project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to a grade 3 feet above the deduced confined flood of 1912, with a section having a crown of 8 feet width, river slope 1 on 3, land slope 1 on 3 to 8 feet below crown, and thence a banquette of varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results during the fiscal year.—There has been added during the year, under contract, and by hired labor, 154,833.68 cubic yards at a total cost of $26,753.32.

The total work done by the United States and local authorities is as follows:

Constructed by the United States	cubic yards	154, 833
Constructed by local authorities	do	108, 511
Total constructed during the year	do	263, 344
Work done by the United States	per cent	58. 79

The work under construction and the progress thereon is shown in the following tables and has resulted in increased protection against floods:

Name of levee.	Kind of work.	Miles below Cairo.	Length.	Average height.	In contract.
			Feet.	*Feet.*	*Cubic yards.*
Belle Chasse	New	988 R.	1,587	13.0	40, 425
Live Oak	Enlarging	994 R.	12,100	12.0	55, 529
Happy Point	New and enlargment	997 R.	4, 206	12.0	44, 604
Deer Range	do	1,008 R.	11,158	12.0	75, 093
Magnolia	do	1,015 R.	14,040	10.5	67, 387
Lower Riceland	do	1,019 R.	3,490	12.2	44, 349
Rhodey to Reddick	do	1,038-41 R.	19,916	8.0	95, 285
Total					422, 402

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	Cubic yards.	*Cubic yards.*	*Cents.*		*Cubic yards.*
Belle Chasse	40, 425.00	40, 425.00	12.84	[1] $5, 190.31	
Live Oak	55, 259.00	55, 259.00	15.57	[2] 8, 601.60	
Happy Point			15.40		44, 604
Deer Range	47, 643.78	47, 643.78	15.94	7, 594.42	27, 450
Magnolia			19.54		67, 387
Lower Riceland	2, 000.00	2, 000.00	39.89	[3] 797.87	(4)
Rhodey to Reddick	9, 505.90	9, 505.90	19.00	1, 806.12	(4)
Total	154, 833.68	154, 833.68		23, 990.32	

[1] Cost by hired labor.

[2] Grading and dressing completed by wheelbarrows.

[3] Average cost for completed work, $17.08.

[4] Completed by contract.

Cost of construction of wooden revetment.

	Linear feet.	Cost.
Belle Chasse wooden revetment (988 R.)[1]	1,587	$4,036.61
Live Oak wooden revetment (994 R.)	9,389	12,389.48
Deer Range wooden revetment (1,008 R.)		1,971.26
Rhodey to Reddick wooden revetment	7,527	8,774.03

[1] This revetment was built with a creosoted footing.

Work was done by hired labor and with Government plant as follows:

Machine and location.	Mobilization.	Clearing.	Draining.	Plowing.	Operations.	Repairs.	Dressing.
B-1, Belle Chasse	$561.30	$90.82		$54.00	$3,373.79	$524.24	$545.36
B-1, Live Oak	493.69	971.36	$24.80	165.00	4,946.73	1,011.09	840.00

Machine and location.	Sodding.	Surveys.	Depreciation.	Overhead.	Total cost.	Handled.	Cost per yard.
						Yards.	
B-1, Belle Chasse	$28.80	$12.00	$690.00	$323.00	$6,203.31	40,425	$0.1534
B-1, Live Oak	104.00	44.93	1,150.00	600.00	10,351.60	55,259	.1873

Work on various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work finished.	Remarks.
Belle Chasse	988 R.	Nov. 12, 1917	Dec. 17, 1917	
Belle Chasse, wood revetment	988 R.	Feb. 18, 1918	Mar. 30, 1918	
Live Oak	994 R.	Dec. 18, 1917	Feb. 13, 1918	
Live Oak, wood revetment	994 R.	Feb. 25, 1918	June 10, 1918	
Happy Point	997 R.			Work not begun.
Deer Range	1,008 R.	Feb. 26, 1918		Under construction.
Deer Range, wood revetment	1,008 R.	June 17, 1918		Do.
Magnolia	1,015 R.			Work not begun.
Lower Riceland	1,019 R.	Dec. 12, 1916	July 31, 1917	
Rhodey to Reddick	1,038–41 R.	Jan. 19, 1917	Nov. 30, 1917	
Rhodey to Reddick, wood revetment	1,038–41 R.	Jan. 30, 1918	Apr. 8, 1918	

Contracts in force.

Name of contractor.	Amount of work.	Character of work.	Unit price.	Date of approval.
	Yards.		*Cents.*	
Lester F. Alexander	44,604	Enlargement	15.4	Dec. 1, 1917
Do	73,113	Enlargement and new	15.94	Do.
Do	67,337	Enlargement	19.54	Do.

Name of contractor.	Date of beginning.	Date of expiration.	Completed.	Name of levee.	Miles below Cairo.
			Per ct.		
Lester F. Alexander	Jan. 15, 1918	Dec. 31, 1918	100	Happy Point	997 R.
Do	do	do	62.2	Deer Range	1,008 R.
Do	do	do	100	Magnolia	1,015 R.

Condition at end of fiscal year.—The following is the condition of the levees at the end of the fiscal year (June 30, 1918):

Project for earthwork	per cent completed	85.4
Miles in system		71.15
Miles built		71.15
Yardage lost by abandoning old levees	cu. yds	125,067
Contents of levees (June 30, 1918)	do	4,930,709
Required to bring levees to grade and section and to construct new levees, which will become necessary within the next five years, cubic yards		1,137.623
Required to bring levees to grade and section	cu. yds	843,201
Miles of levees above highest water:		
Less than 1 foot		.18
From 1 to 2 feet		8.06
From 2 to 3 feet		14.71
From 3 to 4 feet		7.49
Miles of levees up to full grade but deficient in section		2.28
Miles of levees up to full grade and section		38.43

Local cooperation.—Local authorities have expended between 1882 and January 1, 1918, $732,733.51 in building, improving, and maintaining the levee line. Other expenditures since 1882 and heavy ones previous thereto are known to have been made, but no accurate record of them has been discovered. Under conditions of the flood-control bill (H. R. 14777, 64th Cong.), requiring local interests to contribute "not less than one-half of such sum as may have been allotted by the commission," the following contributions for work under the existing project have been made:

Lafourche levee district	$32,000
Buras levee district	8,000

Terminal facilities.—None.

Effect of improvement.—The effect of the work has been to give added protection against floods. Complete protection is not yet afforded; any delay may cause serious damage.

Proposed operations.—It is proposed to continue to strengthen the levee line by enlarging weak and low levees to the approved grade and section adopted by the Mississippi River Commission, building new levees to replace those threatened by caving banks, and making minor repairs where necessary.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30 1918, after deducting receipts from sales, etc., amounting to $894,122.42:

New work	$756,653.85
Maintenance	137,468.57
Net total expended	894,122.42
Total appropriations to June 30, 1918	985,219.38

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [1]	$80,832.42	$63,210.15	$62,626.41	$42,458.58	$31,405.80
Expended for maintenance [1]	6,580.25	1,572.49	10,536.69	....	26,137.30
Total expended [1]	87,412.67	64,782.64	73,163.10	42,458.58	57,543.10
Appropriated or allotted	75,000.00	60,000.00	95,000.00	80,496.51	....

[1] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended		$68,143.55
Amount appropriated by sundry civil act approved June 12, 1917		80,496.51
Receipts from sales, etc., during fiscal year 1918		1.25
		148,641.31
June 30, 1918, amount expended during fiscal year:[1]		
For new work	$31,405.80	
For maintenance	26,137.30	
		57,543.10
July 1, 1918, balance unexpended		91,098.21
July 1, 1918, outstanding liabilities	[2] $59,355.98	
July 1, 1918, amount covered by uncompleted contracts	31,742.23	
		91,098.21
Amount (estimated) required to be appropriated for completion of existing project[3]		Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920[3]		Indeterminate.

Funds contributed for improvement of Mississippi River in Barataria levee district.

SPECIAL FUNDS.

Amount contributed (for expenditure in the Barataria levee district by the board of commissioners, Buras levee district)	$8,000
Amount contributed (for expenditure in the Barataria levee district by the board of commissioners, Lafourche Basin levee district	32,000
	40,000
Amount covered by uncompleted contracts	32,000
July 1, 1918, balance available	8,000

(e) *Homochitto levee district.*

Location and description.—The Homochitto levee district extends on the left bank from the mouth of the Yazoo River, 559 miles below Cairo, to Baton Rouge, 834 miles below Cairo, with a river frontage of 234 miles and an area of 233 square miles. There is no continuous levee line, several disconnected short levees exist, and loops are built at Rodney to Coles Creek, 659 to 666 miles below Cairo; Palmetto Point, 745 to 752 miles below Cairo; Angola State Farm, 764 to 770 miles below Cairo; and Bayou Sara, 800 miles below Cairo. The total length of these levees is 39.77 miles.

Original condition.—Originally there were no levees and the country was subject to overflow. The levees were all built by property owners previous to 1912.

Previous project.—No project for work by the United States existed previous to 1912. In 1912 and 1913 the project adopted by the Mississippi River Commission was to rebuild levees damaged by the flood of 1912. This project was completed in 1912.

Existing project.—None.

Operations and results during fiscal year.—None.

Conditions at end of fiscal year.—There is no continuous levee line. There are several small detached levee systems constructed by private parties for their own protection. The total length of these levee lines is 39.77 miles.

Local cooperation.—The levees have been built and maintained by the property owners. No record of their cost is available.

Terminal facilities.—This district has the usual steamboat landings at which steamers plying on the Mississippi River land, principally to receive bulky freight such as cotton and cotton seed, but it is also served by several railroads which receive freight, principally cotton, and bring merchandise for local consumption. The physical connection between the railroads and the landing places is by means of teams hauling from the interior over earth roads to the steamboat landings. There are no roads paralleling the river. These landings have warehouses of an elementary character for sheltering the merchandise received and shipped. The following places are served by steamboats only:

---

[1] Not deducting receipts from sales, etc.
[2] Part of cost of levee-building machine, etc., included.
[3] Exclusive of available fund.

Bruinsburg, Miss. (644 L.).
Rodney, Miss. (652 L.).
Ashland, Miss. (661 L.)
Port Hudson, La. (810 L.).

The following places are served by steamboats and by the Louisiana Railway & Navigation Co.:

Angola, La. (764 L.).
Wilhelm, La. (773.5 L.).
Bayou Sara, La. (800 L.). Also by Yazoo & Mississippi Valley Railroad Co.
Baton Rouge, La. (834 L.).

Baton Rouge, La., is also served by Yazoo & Mississippi Valley Railroad Co., Baton Rouge, Hammond & Eastern Railroad, Southern Pacific Railroad, and the Frisco Railroad. In addition to the railroad facilities indicated above, the Southern Pacific Railroad and the Frisco Railroad also operate transfers for passenger and freight trains between North Baton Rouge, La. (834 L.), and Anchorage, La. (833 R.).

Effect of improvement.—The effect of the improvement already made is to give as large a measure of protection as the value of the lands behind the levees will justify.

Proposed operations.—None.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $2,576:

New work	$2,501.22
Maintenance	74.78
Net total expended	2,576.00
Total appropriations to June 30, 1918	3,000.00

Fiscal year ending June 30.	1910	1912	1918
Expended for new work [1]	$2,501.22		
Expended for maintenance [1]		$5.07	
Total expended [1]	2,501.22	5.07	$69.71
Appropriated or allotted	3,000.00		

[1] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended	$493.71
June 30, 1918, amount expended during fiscal year [1] for maintenance	69.71
July 1, 1918, balance unexpended	424.00
July 1, 1918, balance available	424.00

(*f*) *Pontchartrain levee district.*

Location and description.—The Pontchartrain levee district extends on the left bank from the lower limits of Baton Rouge, 834 miles below Cairo, to New

---

[1] Not deducting receipts from sales, etc.

Orleans, 957.5 miles below Cairo, with a river frontage of 123.5 miles. The levee line is continuous and is 125.55 miles in length. The Pontchartrain and Lake Borgne levee districts comprise the same basin, which has a total area of 1,816 square miles.

Original condition.—Originally, there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

Existing project.—The present project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to a grade 3 feet above the deduced confined flood of 1912, with a section having a crown of 8 feet width, river slope one on three, land slope one on three to 8 feet below crown, and thence a banquette of varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results during the fiscal year.—There has been added during the year, under contract, and by hired labor, 1,240,820.37 cubic yards, at a total cost of $176,607.02.

Total work done by the United States and local authorities is as follows:

Constructed by the United States	cubic yards	1, 240, 820
Constructed by local authorities	do	578, 221
Total constructed during year	do	1, 819, 041
Work done by the United States	per cent	68. 2

The completed levee line is 18.90 in length.

The work under construction and the progress thereon is shown in the following tables and has resulted in increased protection against floods:

Name of levee.	Character of work.	Miles below Cairo.	Length.	Average height.	In contract.
			Feet.	*Feet.*	*Cubic yards.*
Ben Hur to Burtville	New and enlargement	845-7 L.	12,199	18.1	436,540.57
Towles	do	850-3 L.	12,918	18.0	412,930 03
Golden Gate-Oakley	do	900-2 L.	19,474	18.5	450,000.00
Nita	Enlargement	902- L.	6,242	16.0	129,561.30
Dicharry	do	888- L.	21,238	20.5	192,223.00
Reserve	New	925- L.	2,174	14.0	102,491.47
Total					1,723,746.37

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	Cubic yards.	*Cubic yards.*	*Cents.*		*Cubic yards.*
Ben Hur to Burtville	426,612.57	426,612.57	8.37	[1] $35,745.06	
Towles	412,930.03	412,930 03	12.7	52,442.11	
Golden Gate-Oakley			9.45		450,000.00
Nita	129,561.30	129,561.30	12.00	15,547.34	
Dicharry	169,225.00	169,225.00	19.34	[1] 32,730.15	22,998.00
Reserve	102,491.47	102,491.47	12.89	13,215.83	
Total	1,240,820.37	1,240,820.37		149,680.49	472,998.00

[1] Field cost by hired labor and Government plant.

The following work was done by hired labor:

Shannon (838–L.), 2,810 cubic yards were replaced in slide, at a cost of $715.

Southwood (876–L.), slide was cut out and earth restored at a cost of $7,177.96.

Work was done by hired labor and with Government plant as follows:

Machine and location.	Mobilization.	Clearing.	Plowing.	Operation.	Repairs.	Dressing.	Sodding.
B-3, Ben Hur to Burtville	$1,850.00	$1,043.47	$354.75	$26,191.59	$1,886.25	$4,089.00	234.00
B-2 and B-6, Dicharry	3,531.68	415.90	251.25	22,865.89	2,964.54	2,452.09	184.00
B-3, Reserve	3,360.71	134.46	73.50	7,728.13	854.00	922.43	101.00

Machine and location.	Surveys.	Depreciation.	Overhead.	Total cost.	Yards handled.	Cost per cubic yard.
B-3, Ben Hur to Burtville	$96.00	$6,175.00	$1,976.59	$43,896.59	426,612.50	$10.29
B-2 and B-6, Dicharry	64.80	11,761.00	3,000.00	47,498.15	169,225.00	28.06
B-3, Reserve	28.60	3,030.00	977.00	17,222.83	102,491.47	16.80

Work on various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work finished.	Remarks.
Ben Hur to Burtville	845-47 L.	Mar. 16, 1917	Nov. 8, 1917	
Towles	850-53 L.	June 6, 1917	Jan. 9, 1918	
Golden Gate-Oakley	860-62 L.			Not commenced.
Nita	902 L.	Oct. 29, 1917	Mar. 2, 1918	
Dicharry	888 L.	Feb 5, 1918		Not completed.
Reserve	925 L	Dec. 4, 1917	Jan. 26, 1918	

Contracts in force.

Name of contractor.	Amount of work.	Character of work.	Unit price.	Date of approval.	Date of beginning.	Date of expiration.	Name of levee.
Grasser Contracting Co.	533,000	New and enlargement.	*Cents.* 9.45	1917 Dec. 1	1917 Dec. 21	1918 Dec. 31	Golden Gate-Oakley (860-62 L.).

Condition at end of fiscal year.—The following is the condition of the levees at the end of the fiscal year (June 30, 1918):

Project for earthwork is ____ per cent completed	73.7
Miles in system	125.35
Miles built	125.35
Yardage lost during the year ____ cubic yards	538,741
Contents of levees (June 30, 1918) ____ do	23,705,806
Required to bring levees to grade and section ____ do	8,463,358
Required to bring levees to grade and section and to construct new levees, which will become necessary within the next five years ____ cubic yards	9,279,700
Miles of levee above highest water—	
Less than 1 foot	None.
From 1 to 2 feet	11.36
From 2 to 3 feet	57.26
From 3 to 4 feet	17.40
From 4 to 5 feet	None.
Miles of levee up to grade but deficient in section	20.43
Miles of levee up to full grade and section	18.90

Local cooperation.—Local authorities have expended, in part and between 1882 and January 1, 1918, $4,609,914.34 in building, improving, and maintaining the levee line. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no accurate record of them has been discovered. Under conditions of the flood-control bill (H. R. 14777, 64th Cong.), requiring local interests to contribute "not less than one-half of such sum as may have been allotted by the commission" the Pontchartrain Levee Board has contributed for work under existing project $40,000.

Terminal facilities.—This district has landing places at every plantation for steamboats plying on the Mississippi River to discharge merchandise for local consumption and to receive freight. These places are served immediately in the rear by the Yazoo & Mississippi Valley Railroad. A limited mileage of good roads paralleling the river is being constructed. On the whole the district has poorly kept earth roads. The physical connection between these landing places and the railroad is by means of teams hauling over earth roads and ramps over the levees and graded approaches to the landing places at the water's edge. There are at the following landings warehouses of an elementary character for the purpose of sheltering freight received and shipped:

Burtville, La. (848 L.).
St. Gabriel, La. (862.5 L.).
Geismar, La. (882 L.).
Darrow, La. (889 L.).
Burnside, La. (894 L.).
Convent, La. (905 L.).
Lutcher, La. (916 L.).
Gareyville, La. (924 L.).
Reserve, La. (926 L.).
Kenner, La. (951 L.).
Harahan, La. (956 L.).

There is deep water as far us as the mouth of Red River. The water terminals at Baton Rouge, La. (844 L.), where the Standard Oil Co. of Louisiana's plant is located, and at Grammercy, La. (917 L.), where is located the sugar refinery of the Grammercy Co., which refines sugar in transit for export, and also at Good Hope, La. (938 L.), and at Destrehan, La. (956 L.), where are located oil companies engaged in the oil export business, are places which have substantially built landing places where seagoing steamers discharge and receive cargoes.

Effect of improvement.—The effect of the work has been to give added protection against floods. Complete protection is not yet afforded and delay may cause serious damage.

Proposed operations.—It is proposed to continue to strengthen the levee line by enlarging weak and low levees to the approved grade and section, adopted by the Mississippi River Commission, building new levees to replace those threatened by caving banks, and making minor repairs where necessary.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $2,388,268.29:

New work	$2,204,705.07
Maintenance	183,563.22
Net total expended	2,388,268.29
Total appropriations to June 30, 1918	2,412,008.02

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [1]	$102,384.34	$54,677.25	$38,815.07	....	$142,708.83
Expended for maintenance [1]	616.33	....	14,461.00	$87,272.88	12,552.66
Total expended [1]	103,000.67	54,677.25	53,276.07	87,272.88	155,261.49
Appropriated or allotted	100,000.00	45,000.00	125,000.00	81,878.41	....

---

[1] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended		$96,122.81
Amount appropriated by sundry civil act approved June 12, 1917		81,878.41
Receipts from sales, etc., during fiscal year 1918		1,742.84
		179,744.06
June 30, 1918, amount expended during fiscal year:[1]		
For new work	$142,708.83	
For maintenance	12,552.66	
		155,261.49
July 1, 1918, balance unexpended		24,482.57
July 1, 1918, amount covered by uncompleted contracts		24,482.57
Amount (estimated) required to be appropriated for completion of existing project		[2] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920		[2] Indeterminate.

Funds contributed for improvement of Mississippi River in Pontchartrain levee district.

SPECIAL FUNDS.

Amount contributed for expenditure in the Pontchartrain levee district by the board of commissioners, Pontchartrain levee district	$40,000
Amount covered by uncompleted contracts	40,000

(g) *Lake Borgne levee district.*

Location.—The Lake Borgne levee district extends on the left bank from the lower limits of New Orleans, 973 miles below Cairo, to the Head of the Passes, 1,064 miles below Cairo, with a river frontage of 91 miles. The levee line is continuous to a point about 14 miles above the Head of the Passes, a length of 79.29 miles. The Lake Borgne and Pontchartrain levee district comprise the same basin, which has a total area of 1,816 square miles.

Original condition.—Originally there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

Existing project.—The present project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to a grade 3 feet above the deduced confined flood of 1912, with a section having a crown of 8 feet width, river slope one on three, land slope one on three to 8 feet below crown, and thence a banquette of varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results during the fiscal year.—There has been added during the year, under contract and by hired labor, 176,782 cubic yards, at a total cost of $32,441.97.

The total work done by the United States and local authorities is as follows:

Constructed by the United States	cubic yards	176,782
Constructed by local authorities	do	167,863
Total constructed during the year	do	344,645
Work done by the United States	per cent	51.29

The effect has been to give increased security against floods. The completed levee line is 47.92 miles in length.

The work under construction and the progress thereon is shown in the following tables and has resulted in increased protection against floods:

---

[1] Not deducting receipts from sales, etc.

[2] Exclusive of available funds.

Name of levee.	Kind of work.	Miles below Cairo.	Length.	Average height.	In contract.
			Feet.	*Feet.*	*Cubic yards.*
Kenilworth	New and enlargement	983 L.	5,049	13.0	58,767.53
Scarsdale	do	988-90 L.	8,669	12.5	78,426.00
Burbridge	do	1,000-2 L.	11,316	9.1	70,015.00
Harlem to Savoie	Enlargement	1,008-10 L.	18,544	10.0	94,858.00
Martin to Bohemia	New and enlargement	1,015 L.	4,630	8.1	18,826.00
Fort St. Philip		1,041 L.	5,383	5.8	25,100.00
Total					345,992.53

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	Cubic yards.	*Cubic yards.*	*Cents.*		*Cubic yards.*
Kenilworth	47,510	41,902.25	15.4	$6,452.95	11,257.53
Scarsdale	78,426	78,426.00	15.99	[1] 12,545.30	
Burbridge	36,946	36,946.00	15.42	[1] 5,699.00	
Harlem to Savoie			15.4		94,858.00
Martin to Bohemia			19.94		18,826.00
Fort St. Philip	13,900	13,900.00	30.48	[1] 4,236.72	[2]
Total	176,782	171,174.25		28,933.97	

[1] Cost by hired labor.

[2] Average cost for completed work, 16.27 cents per cu. yd.

Cost of construction of wooden revetments.

	Linear feet.	Cost.
Scarsdale, wooden revetment	1,472	$2,250.32
Burbridge, wooden revetment	6,300	8,567.05

Work was done by hired labor and with Government plant, as follows:

Machine and location.	Mobilization.	Clearing.	Draining.	Plowing.	Operation.	Repairs.	Dressing.
B-1, Scarsdale	$532.00	$296.00	$34.56	$84.00	$9,216.44	$1,193.50	$1,035.00
B-1, Burbridge	636.00	155.10		67.00	3,793.08	442.92	556.22
B-1, Fort St. Philip	416.52	88.00		36.00	3,138.34	517.06	

Machine and location.	Sodding.	Surveys.	Depreciation.	Overhead.	Total cost.	Handled.	Cost per yard.
						Yards.	
B-1, Scarsdale	$94.80	$68.00	$1,545.00	$448.00	$14,539.30	78,426	$0.1854
B-1, Burbridge	24.50	24.18	773.00	215.00	6,687.00	36,946	.1809
B-1, Fort St. Philip	24.80	16.00	400.00	126.00	4,762.72	13,900	.3426

Work on various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work finished.	Remarks.
Kenilworth	983 L.	May 3, 1918		Under construction.
Scarsdale	988-90 L.	Aug. 11, 1917	Nov. 11, 1917	
Scarsdale, wood revetment	990 L.	Feb. 5, 1918	Mar. 1, 1918	
Burbridge	1,000-2 L.	June 15, 1916	Aug. 10, 1917	
Burbridge, wood revetment	1,000-2 L.	Feb. 24, 1918	Apr. 5, 1918	
Harlem to Savoie	1,008-10 L.			Work not begun.
Martin to Bohemia	1,015 L.			Do.
Fort St. Philip	1,041 L.	May 18, 1917	June 24, 1917	

Contracts in force.

Name of contractor.	Amount of work.	Character of work.	Unit prices.	Date of approval.
			Cents.	1917.
Lester F. Alexander	58,768	Enlargement and new	15.4	Dec. 1
Do	94,918	Enlargement	15.4	Do.
Do	18,826	do	19.94	Do.

Name of contractor.	Date of beginning.	Date of expiration.	Completed.	Name of levee.	Miles below Cairo.
	1918.	1918.	*Per ct.*		
Lester F. Alexander	Jan. 15	Dec. 31	80.8	Kenilworth	983 L.
Do	do	do	100.0	Harlem-Savoie	1,008–10 L.
Do	do	do	100.0	Martin-Bohemia	1,015 L.

Conditions at end of fiscal year.—The following is the condition of the levees at the end of the fiscal year (June 30, 1918):

Project for earthwork per cent completed	90.2
Miles in system	78.13
Miles built	78.13
Yardage lost by abandoning old levees cubic yards	178,430
Contents of levees (June 30, 1918) do	5,766,387
Required to bring levees to grade and section do	626,369
Required to bring levees to grade and section and to construct new levees which will become necessary within the next 5 years, cubic yards	838,785
Miles of levees above highest water:	
Less than 1 foot	None.
From 1 to 2 feet	8.78
From 2 to 3 feet	15.41
From 3 to 4 feet	2.99
Miles of levee up to full grade but deficient in section	3.03
Miles of levee up to full grade and section	47.92

Local cooperation.—Local authorities have expended between 1882 and January 1, 1918, $1,928,439.55 in building, improving and maintaining the levee line. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no accurate record of them has been discovered. Under conditions of the flood-control bill (H. R. 14777, 64th Cong.), requiring local interests to contribute "not less than one-half of such sum as may have been allotted by the commission," the Lake Borgne Levee Board has contributed $25 000 for work under existing project.

Terminal facilities.—None.

Effect of improvement.—The effect of the work has been to give added protection against floods. Complete protection is not yet afforded and delay may cause serious damage.

Proposed operations.—It is proposed to continue to strengthen the levee line by enlarging weak and low levees to the approved grade and section adopted by the Mississippi River Commission, building new levees to replace those threatened by caving banks, and making minor repairs where necessary.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $772,630.45:

New work	$692,474.17
Maintenance	80,156.28
Net total expended	772,630.45
Total appropriations to June 30, 1918	822,868.15

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [1]	$86,591.66	$45,128.80	$51,291.74	$28,338.48	$19,953.17
Expended for maintenance [1]	2,468.77	....	8,030.58	....	17,301.14
Total expended [1]	89,060.43	45,128.80	59,322.32	28,338.48	37,254.31
Appropriated or allotted	75,000.00	40,000.00	50,000.00	50,468.15	....

[1] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended		$37,023.86
Amount appropriated by sundry civil act approved June 12, 1917		50,468.15
		87,492.01
June 30, 1918, amount expended during fiscal year: [1]		
For new work	$19,953.17	
For maintenance	17,301.14	
		37,254.31
July 1, 1918, balance unexpended		50,237.70
July 1, 1918, outstanding liabilities	134.18	
July 1, 1918, amount covered by uncompleted contracts	25,989.70	
		26,123.88
July 1, 1918, balance available for maintenance		24,113.82
Amount available for fiscal year ending June 30, 1919		24,113.82

Amount (estimated) required to be appropriated for completion of existing project	[2] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920	[2] Indeterminate.

Funds contributed for improvement of Mississippi River in Lake Borgne levee district.

SPECIAL FUNDS.

Amount contributed (for expenditure in Lake Borgne levee district, by board of commissioners Lake Borgne Basin levee district	$25,000
Amount covered by uncompleted contracts and levee work and revetment to be done by hired labor	25,000

III. SURVEYS.

Location and description.—Surveys are made wherever required throughout the limits of the district.

Original condition.—Lack of surveys made data for studies of the river incomplete.

Previous projects.—None.

Existing project.—The project adopted by the Mississippi River Commission in 1884 provides for an annual survey, at the lowest river stage, of each locality where work is in progress. In 1888 the project was amplified to include surveys of caving banks wherever important interests are threatened. Except for New Orleans Harbor, surveys of works are included in the cost of the works and reported therein. Special surveys are made, as ordered, from time to time by the Mississippi River Commission.

---

[1] Not deducting receipts from sales, etc.

[2] Exclusive of available funds.

Operations and results during the fiscal year.—Surveys have been made of caving banks at Oak and Newtown Bends, Diamond Island Bend, Lake Palmyra, and at Yucatan Bend; also of caving banks between Natchez and Red River Landing. The same survey parties also made surveys of the several localities at which revetment work has been done. A special survey of a shoal crossing at Brusle, La., below Baton Rouge, was made. The expenditures amounted to $8,869.08.

Condition at end of year.—All required surveys have been made during the year except in parts of New Orleans Harbor. The constant changing of the banks and bed of the river necessitates the steady work of two survey parties.

Local cooperation.—There is no local cooperation in making surveys. The maps and records of the Board of State Engineers of Louisiana are placed at the disposal of the United States whenever information therefrom is desired.

Terminal facilities.—None.

Effect of improvement.—The surveys made during past years and the present year furnish valuable data for the study of the river at definite localities and for making plans for improvements at these localities.

Proposed operations.—It is proposed to continue work under the present project, making annual surveys of each revetment and such other surveys as may become necessary.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1918, after deducting receipts from sales, etc., amounting to $164,187.46:	
New work	$25, 201. 37
Maintenance	138, 986. 09
Net total expended	164, 187. 46
Total appropriations to June 30, 1918	[1] 165, 391. 06

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work [2]	$148.68	$744.45	$741.00	....	....
Expended for maintenance [2]	3,640.54	4,840.06	666.19	$3,111.04	$8,869.08
Total expended [2]	3,789.22	5,584.51	1,407.19	3,111.04	8,869.08
Appropriated or allotted	....	8,000.00	5,000.00	5,459.01	....

---

[1] Total amount, $168,596.15; $3,205.09 transferred to first and second Mississippi River districts.

[2] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended	$7,818.76
Amount appropriated by sundry civil act approved June 12, 1917	5,459.01
Receipts from sales, etc., during fiscal year 1918	10.25
	13,288.02
Deduction on account of transfer to first and second Mississippi River district	3,205.09
	10,082.93
June 30, 1918, amount expended during fiscal year for maintenance[1]	8,869.08
July 1, 1918, balance unexpended	1,213.85
July 1, 1918, outstanding liabilities	857.63
July 1, 1918, balance available for maintenance	356.22
Amount available for fiscal year ending June 30, 1919	356.22
Amount (estimated) required to be appropriated for completion of existing project	[2] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920	[2] Indeterminate.

IV. PLANT.

(*a*) *Revetment plant.*

Location and description.—At New Orleans, La., and Natchez, Miss., respectively, 965 and 700 miles below Cairo.

Original condition.—None.

Previous projects.—None.

Existing project.—Adopted in 1894, provides for the construction of such new plant as may be required from time to time, and for the repair, maintenance, and care of the plant on hand.

Operations and results during fiscal year.—At date of last annual report the floating plant of the district consisted of 117 large pieces, exclusive of docks, lighters, gasoline launches, pontoons, skiffs, etc. During the year 6 standard barges and 1 quarter boat were built and 1 levee-building machine was assembled for the district. In addition 10 barges and 1 derrick hull were constructed for work at the mouth of the Mississippi, and 2 searchlight barges were framed and creosoted for the Panama Canal. All of the construction was done at the engineer depot by hired labor.

Operations of the creosoting plant for the year shows the following totals: Lumber treated, 171,620 cubic feet; pounds of oil used, 2,422,272; value of creosote used, $64,124.92. The plant was operated for 126 days, during which 63 charges were treated.

Government switch.—During the year 165 cars have been received, comprising 73 of lumber, 10 of coal, 5 of wire and nails, 2 of rope, 4 of machinery, 4 of iron, 54 of earth filling, and 13 of creosote oil.

The existing plant has been repaired and cared for at the United States engineer depot at New Orleans, La., and at Natchez, Miss. All necessary repairs have been made to boats, graders, quarter boats, etc., and the plant placed in good working condition, the work being done by hired labor.

Care of plant.—This includes such items as fire protection, electric light service, watchmen, putting out and taking in spars, mooring lines, etc., operating pump boat, steamboat expenses, issuing and storing property, proportion of general supervision and incidental expenses, and has amounted to about $86.52 for each large piece of plant. The cost is increased by the fact that the plant is cared for at two widely separated localities, New Orleans, La., and Natchez, Miss., necessitating a duplication of some of the charges.

Supt. R. H. Bolen was in charge at the engineer depot of the construction, repair, and care of plant, under the general direction of Assistant Engineer H. S. Douglas.

---

[1] Not deducting receipts from sales, etc.

[2] Exclusive of available funds.

The expenditures during the year were $134,135.96, distributed as follows:

New plant	$16, 197. 38
Repairs to plant	42, 223. 37
Care of plant	10, 729. 16
Administration	1, 610. 71
Work done for other districts	62, 275. 71
Miscellaneous	1, 099. 63
Total	134, 135. 96

Condition at end of fiscal year.—A floating plant, consisting of 124 large pieces for bank revetment, levee construction, and dredging, has been acquired. A fairly complete engineer depot on the river front at New Orleans has been secured. A warehouse, a combined machine, blacksmith, and carpenter shop have been built and a creosoting plant has been installed. Other equipment necessary for building new plant and repairing that on hand has been acquired. Suitable railroad tracks have been built and connected with the Public Belt Railway system of the city of New Orleans. The general condition of the plant is good. The project is not susceptible of completion, as new plant must be built from time to time and existing plant repaired, maintained, and cared for. The expenditures on existing project have been $807,295.47 for new plant and $668,839.40 for maintenance, making a total of $1,476,134.87.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—Acquisition of the necessary plant to prosecute work by day labor and construct necessary revetments in caving bends between Vicksburg and New Orleans.

Proposed operations.—To repair, maintain, and care for the existing plant, and to construct such new plant as may be required.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

(*b*) *Levee plant.*

Location and description.—The general character of operations renders it impracticable to give data as to location and description.

Original condition.—None.

Previous projects.—None.

Existing project.—None.

Operations and results during the fiscal year.—The cost of maintenance has been absorbed in the cost of the work upon which the plant was engaged.

Condition at end of fiscal year.—All levee plant is in good condition except the levee-building machine B–2, which is now undergoing repairs. One locomotive crane levee-building machine of 160-foot radius, with quarterboat, barge, and equipment, was added to the plant at a cost of $89,708.23. The plant has been operated to great advantage during the year and several additional machines are needed to realize the greatest economy in continuing the work. One locomotive crane of 125-foot radius is now under construction and two others of the same type, now being used in the third district, will be transferred to this district in the near future. Additional quarterboats, barges, and equipment will be necessary in order to carry on the work economically.

Local cooperation.—None.

Terminal facilities.—None.

Effect of improvement.—The introduction of Government-owned plant has cheapened the cost of levee work, especially below Red River, and added greatly to the safety of the levees during floods and reduced the cost of high-water protection.

Proposed operations.—Completion of 125-radius locomotive crane under informal contract, with quarterboat and equipment.

Recommended modifications of project.—None.

References to published articles not previously reported.—None.

Commercial statistics.—By resolution of the Mississippi River Commission of November 19, 1914, the secretary is charged with the duty to secure complete commercial statistics of the water-borne traffic on the Mississippi River.

Appropriations.—See current report of the Mississippi River Commission.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30. 1918, after deducting receipts from sales, etc., amounting to $1,476,134.87:	
New work	$807, 295. 47
Maintenance	668, 839. 40
Net total expended	1, 476, 134. 87
Total appropriations to June 30, 1918	1, 538, 825. 43

Fiscal year ending June 30.	1914	1915	1916	1917	1918
Expended for new work[1]	$44, 058. 02	$39, 013. 92	$30, 006. 93	$70, 141. 64	$16, 197. 38
Expended for maintenance[1]	8, 908. 76	67, 917. 96	70, 679. 22	61, 006. 40	55, 662. 87
Total expended[1]	52, 966. 78	106, 931. 88	100, 686. 15	131, 148.04	71, 860. 25
Appropriated or allotted	60, 000. 00	105, 000. 00	160, 000. 00	76, 925. 43	....

[1] Not deducting receipts from sales, etc.

July 1, 1917, balance unexpended		$28, 676. 92
Amount appropriated by sundry civil act approved June 12, 1917		76, 325. 43
Receipts from sales, etc., during fiscal year 1918		9, 948. 80
		114, 951. 15
June 30, 1918, amount expended during fiscal year:[1]		
For new work	$16, 197. 38	
For maintenance	55, 662. 87	
		[2] 71, 860. 25
July 1, 1918, balance unexpended		[2] 43, 090. 90
July 1, 1918, outstanding liabilities		11, 925. 73
July 1, 1918, balance available for maintenance		31, 165. 17
Amount available for fiscal year ending June 30, 1919		[3] 31, 165. 17
Amount (estimated) required to be appropriated for completion of existing project		[3] Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1920, for new work		[3] Indeterminate.

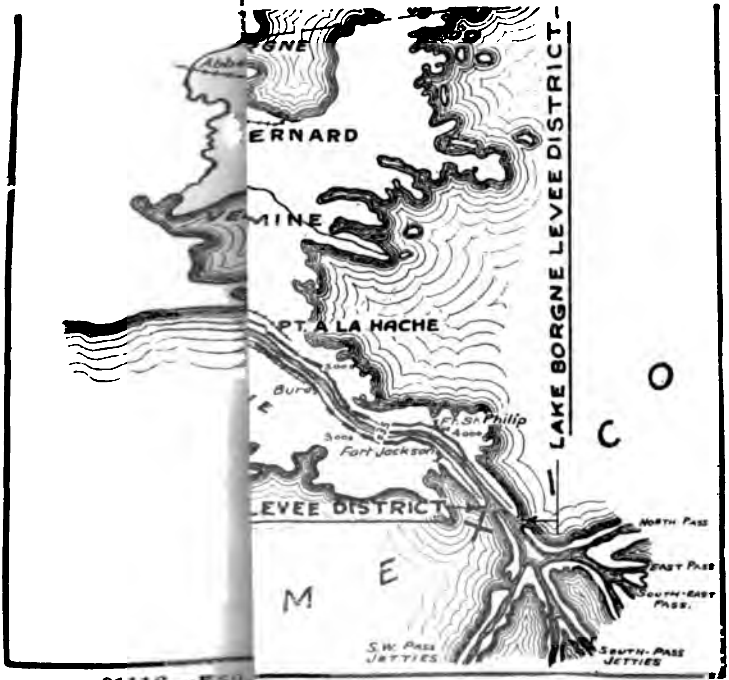
The following inclosures (maps) accompany and form part of this report:

1. Bondurant Chute, La.
2. Kempe Bend, La.
3. Natchez and Vidalia Harbors, Miss. and La.
4. Grand Bay, La.
5. Plaquemine Bend, La.
6. New Orleans Harbor, La.
7. Levee districts—Map fourth district.
8. Lower Tensas levee district profile.
9. Atchafalaya levee district profile.
10. Lafourche levee district profile.
11. Barataria levee district profile.
12. Pontchartrain levee district profile.
13. Lake Borgne levee district profile.

G. McC. Derby,
Lieut. Col., U. S. Army, District Engineer.

---

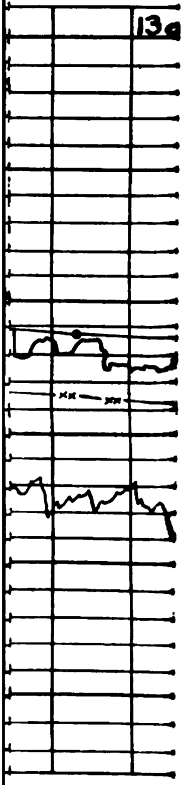
[1] Not deducting receipts from sales, etc.
[2] $6,366.39 due from other offices not included.
[3] Exclusive of available funds.


GNE
Abbe
ERNARD
MINE
PT. A LA HACHE
3000
Bura
Ft. St Philip
4000
3000
Fort Jackson
LEVEE DISTRICT
LAKE BORGNE LEVEE DISTRICT
O
C
E
M
NORTH PASS
EAST PASS
SOUTH-EAST PASS.
S.W. PASS JETTIES
SOUTH-PASS JETTIES

ans, La.
Annual Repo
ng June 30,

ut. Col., U.S

d Commissi
ater 1916.
- 1912.
ilt by U. S. 19
larged --- -
ilt by Local A
larged —



MISSISSIPPI RIVER COMMISSION.

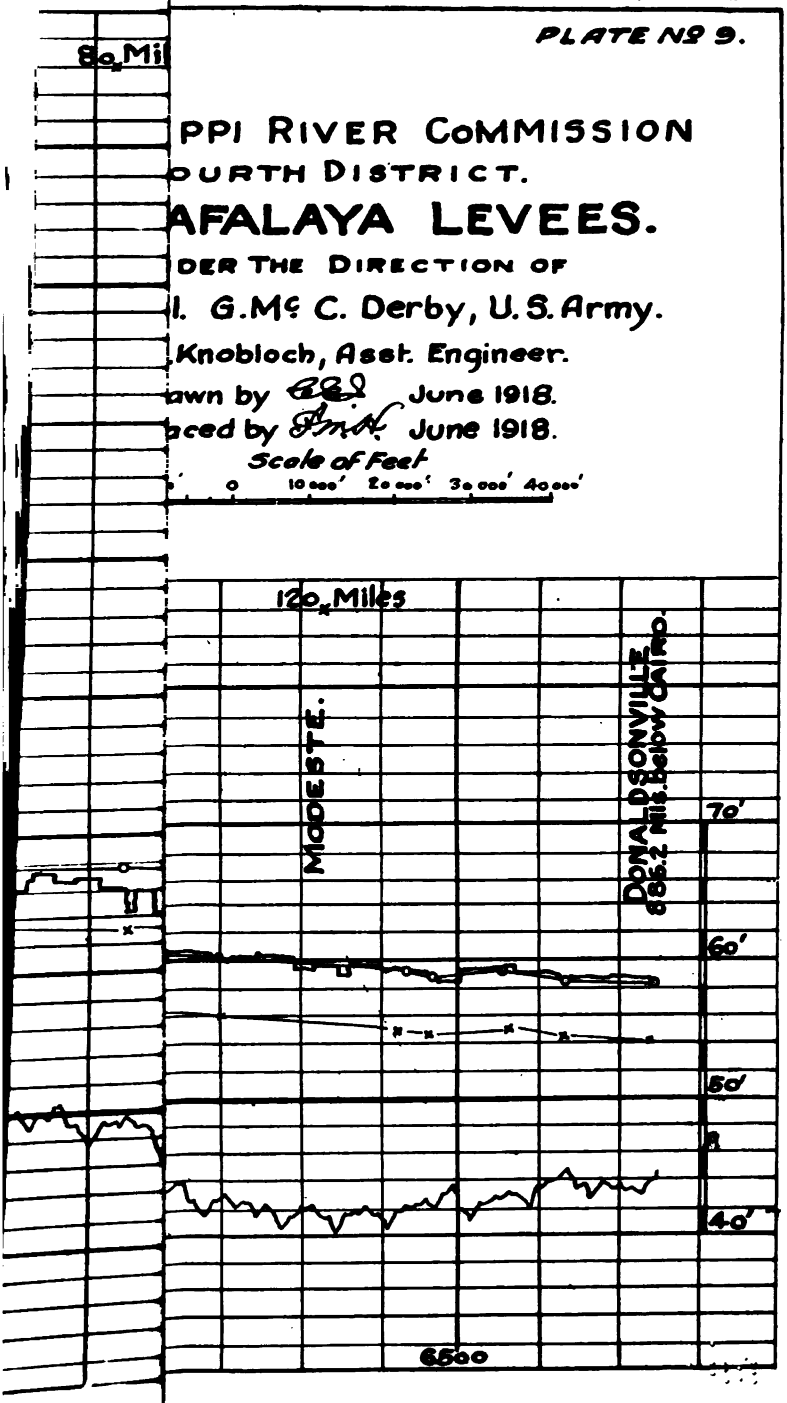


PLATE No 9.

PPI RIVER COMMISSION

OURTH DISTRICT.

AFALAYA LEVEES.

DER THE DIRECTION OF

l. G. Mc C. Derby, U.S. Army.

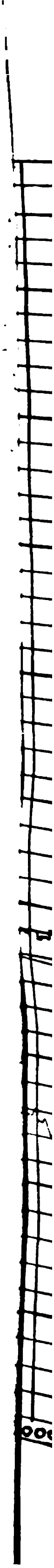
,Knobloch, Asst. Engineer.

awn by June 1918.

aced by June 1918.

Scale of Feet

0 10000' 20000' 30000' 40000'



IPPI RIVER COMMISSION

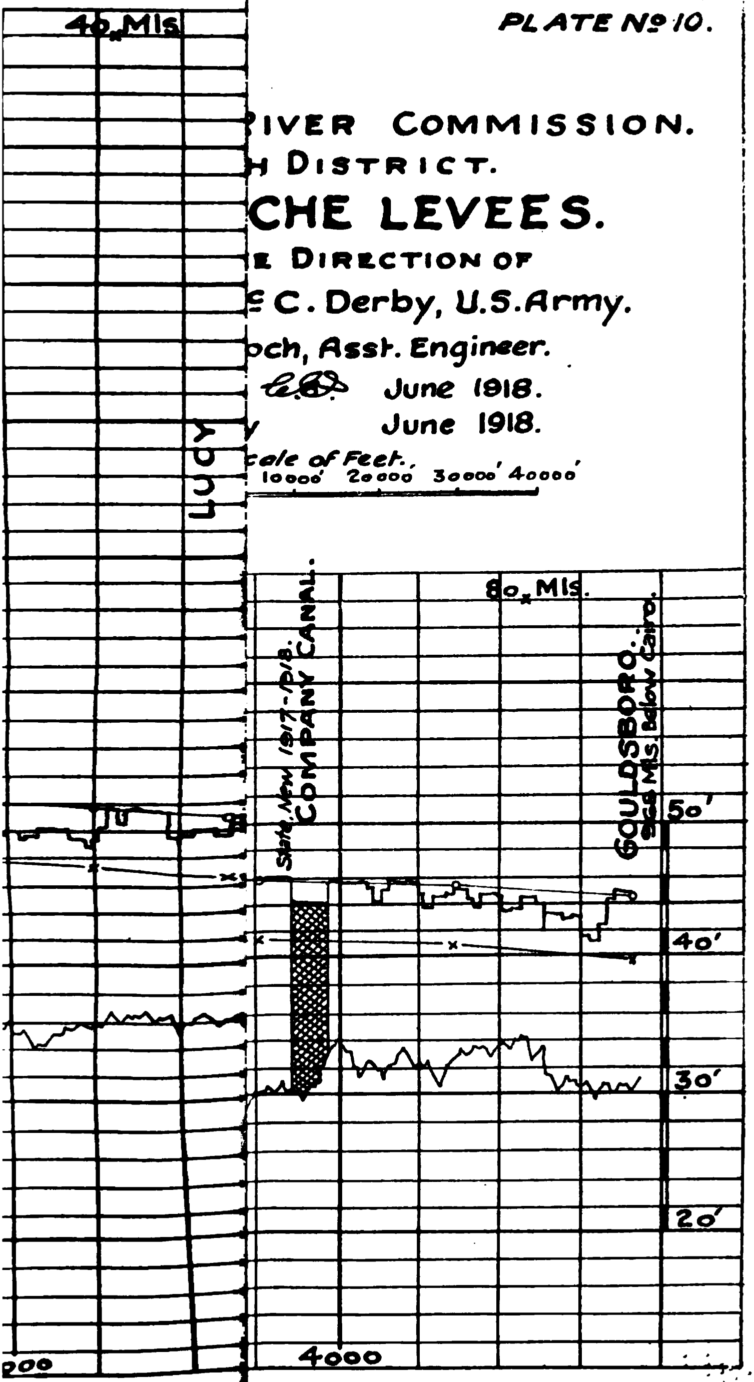
PLATE No 10.

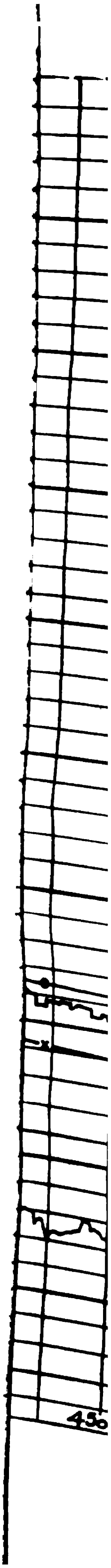
RIVER COMMISSION.
H DISTRICT.

CHE LEVEES.

E DIRECTION OF
E C. Derby, U.S. Army.
och, Asst. Engineer.
June 1918.
y June 1918.

cale of Feet.
10000' 20000 30000' 40000'



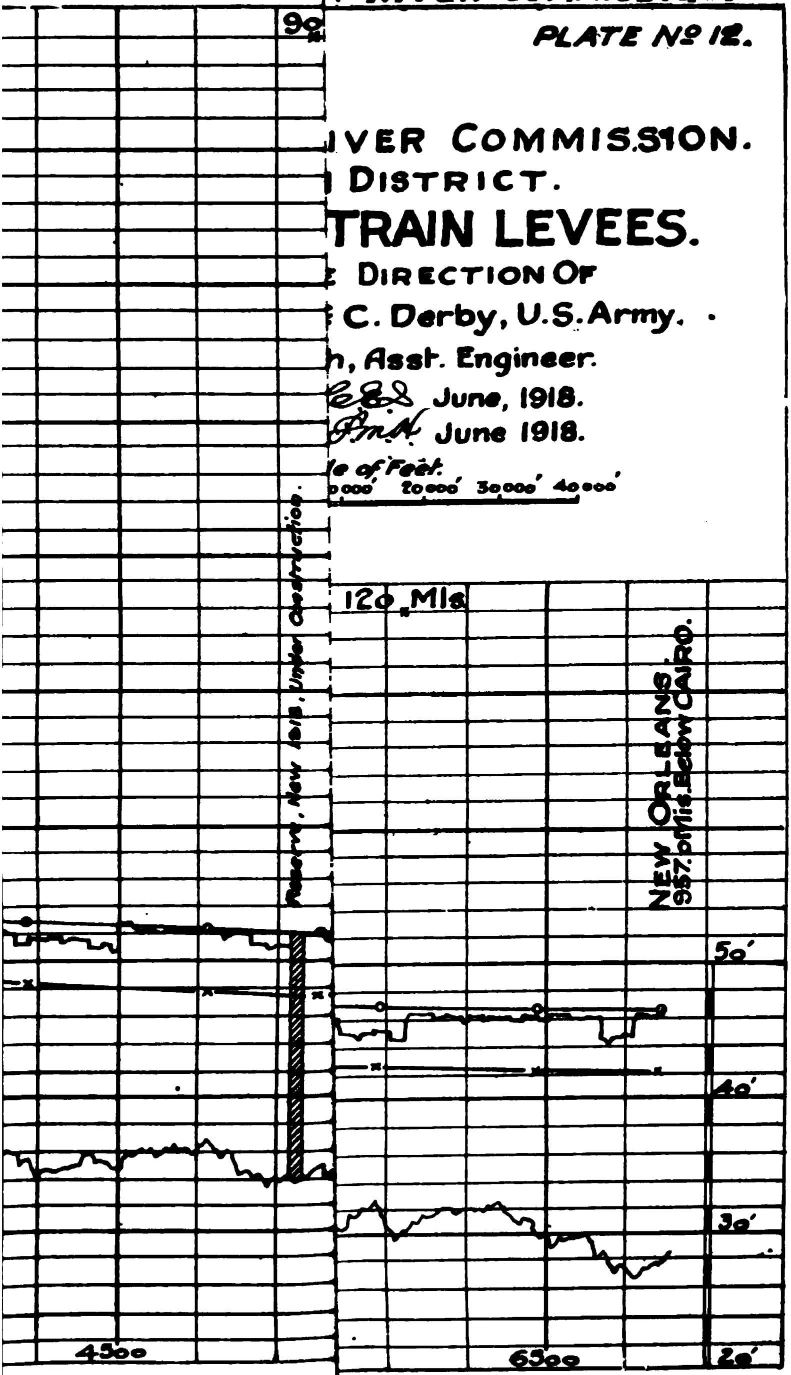

450

RIVER COMMISSION.

PLATE Nº 12.

IVER COMMISSION.
DISTRICT.
TRAIN LEVEES.
DIRECTION OF
C. Derby, U.S. Army.
h, Asst. Engineer.
C.E.S. June, 1918.
P.m.N. June 1918.

le of Feet.
0000' 20000' 30000' 40000'



PI RIVER COMMISSION.

PLATE No 13.

ER COMMISSION.

ISTRICT.

NE LEVEES.

IRECTION OF

. Derby, U.S. Army.

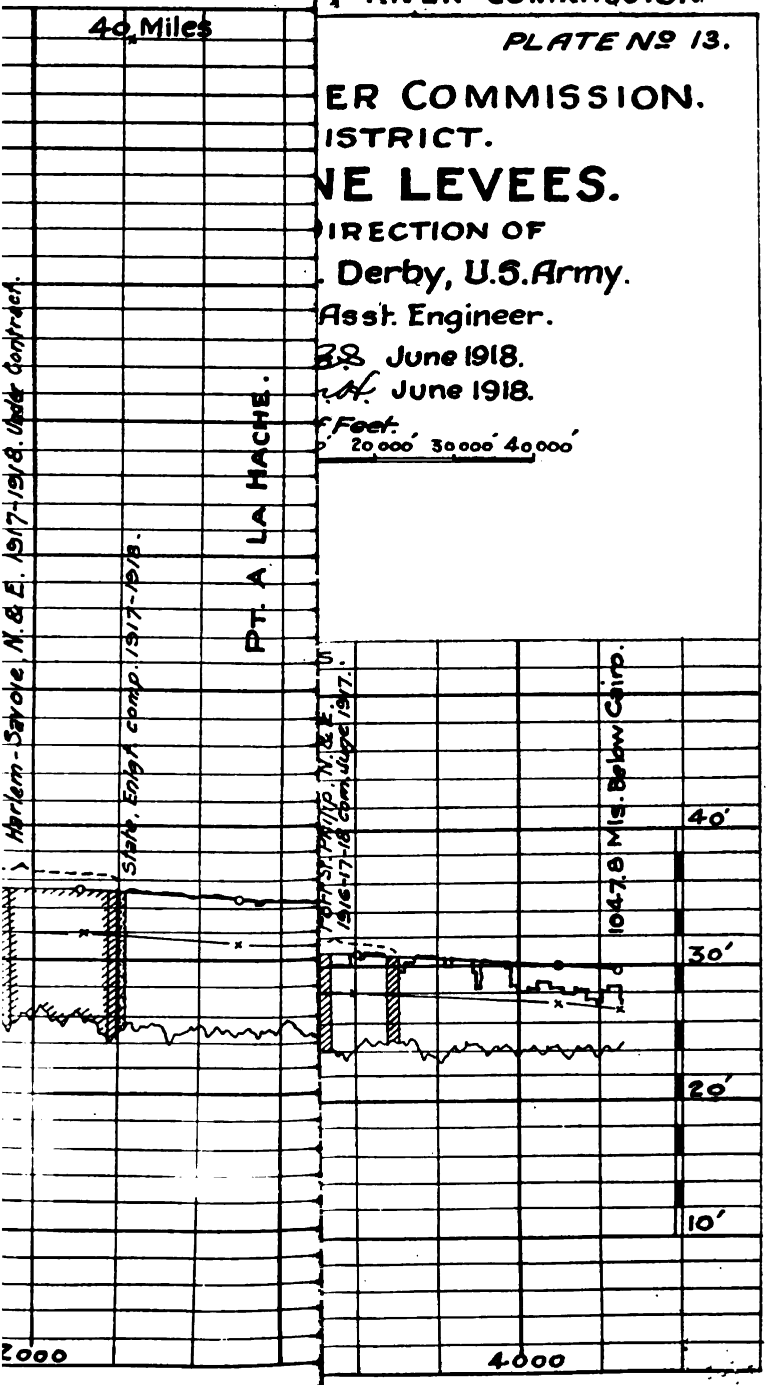
Asst. Engineer.

28 June 1918.

4 June 1918.

f Feet.

20,000' 30,000' 40,000'



APPENDIX 5.

Topical index to Annual Report of the Mississippi River Commission for 1918.

Page.

- Allotments:
  - Gauging the waters of the Mississippi River and its tributaries, 3465
  - Made during year, 3464
  - Reallotments made during the year, 3465
  - Titles of, in charge of secretary, Mississippi River Commission, 3521
- Appendixes, list of, to Annual Report, Mississippi River Commission, 3521
- Appropriations:
  - Expended under the Mississippi River Commission, 3473
  - Gauging the waters of the Mississippi River and its tributaries, 3481
  - Recommended, 3472
- Arkansas River, jurisdiction of commission, 3462
- Atchafalaya River, survey of, 3467, 3522
- Bank protection. (*See* Revetments.)
- Bars:
  - Mississippi River below Cairo—
    - Condition of channel at end of fiscal year, 3472, 3529
      - In original condition, 3523
    - Depths and widths of channel during lowest stages of year, 3472
    - Dimensions of channels through bars, low-water season of 1917 (Table No. 6), 3572
    - Inspection of channels, 3524
    - Names and depths over, low-water season of 1917 (Table No. 5), 3567
    - Notes on conditions and results of dredging at each bar dredged, low-water season of 1917, 3527
    - Summary of dredging operations 1917 (Table No. 7), 3574
    - Surveys, 3524
  - Old River, dredging by dredge *Gamma*, 3524
- Boats. (*See* Plant.)
- Buildings and grounds, West Memphis, Ark, 3528
- Channel, condition of, 3472, 3529
- Charts and maps:
  - Contract for printing maps of resurvey, 3522
  - Issued and sold during year, 3543
- Coal, amount received, etc, 3529
- Commercial statistics, 3541
- Contracts, abstract of, in force:
  - Secretary, 3539
  - First and second districts, 3622
  - Third district, 3670
  - Fourth district given following each work.
- Contributed funds, fiscal year 1918, under flood-control act, 3466
- Creosoting plant:
  - First and second districts, repairs, etc, 3616
  - Fourth district, repairs, etc, 3730
- Crevasses, 3472
- Discharge, Mississippi River and tributaries reported, 3522
  - Results, 3549
- Docks, marine railway, at West Memphis, Ark, 3528
- Dredges and dredging:
  - Mississippi River, Cairo to Head of Passes—
    - Cost of dredging operations, 1917 (Table No. 4), 3565
    - Division of time during dredging season of 1917 (Table No. 7), 3574
    - In Memphis Harbor, 3593

Dredges and dredging—Continued.
  Mississippi River, Cairo to Head of Passes—Continued. Page.
    Material moved during year 3524
    Operations 2524
    Plant, etc., in connections with 3528
    Project 3523
  Old River, dredging by dredge *Gamma* 3524, 3691
Engineer districts under Mississippi River Commission:
  Limits of and officers in charge 3467
    First and second 3580
    Third 3630
    Fourth 3677
Estimate of funds that can be profitably expended during the fiscal year 1920. 3472
Experimental revetments 3607
Extension of jurisdiction of Mississippi River Commission 3462
Financial statements:
  Consolidated statements 3473
  Secretary 3534
  First and second districts 3623
  Third district 3671
  Fourth district given following each work.
Flood-control act of Mar. 1, 1917, policy of commission for work under 3462
Gauges:
  Highest and lowest gauge readings Mississippi River and tributaries (Table No. 1) 3544
  Highest gauge readings, Mississippi River and tributaries, 1918, to June 30 (Table No. 2) 3548
  Inspection and maintenance of 3522
  Stages during the year 3469
Harbors:
  Greenville, Miss 3639
  Memphis, Tenn 3591
  Mouth of Yazoo and harbor of Vicksburg 3654
  Natchez and Vidalia 3685
  New Orleans, La 3699
High water 3470
Hydrographs, Mississippi River, Cairo to Port Jackson, June 1, 1917, to May 31, 1918 (pl. 1) 3578
Laws:
  Affecting the Mississippi River Commission July 1, 1917, to June 30, 1918 .. 3578
  Extract from organic act defining duties of Mississippi River Commission .. 3459
Levees:
  Construction, etc.—
    Above Cape Girardeau 3471, 3529
    Below Cape Girardeau 3470
    First and second districts 3607
    Third district 3661
    Fourth district 3704
  Loss by abandonment and other causes, below Cape Girardeau 3471
  Loss by abandonment and other causes, above Cape Girardeau 3471
  Machine, levee building 3471
  Table showing area of land protected, condition, and extent of levees in all districts—
    Below Cape Girardeau 3470
    Above Cape Girardeau 3471
Maps. (*See* Charts and Maps.)
Mattresses. (*See* Revetments.)
Mississippi River Commission:
  Duties 3459
  Engineers on duty, under, during fiscal year 1918 3467
  Members 3467
  Project 3459
  Sessions of 3467
  Summary of work 3467, 3472
Navigation. (*See* Bars.)
Ohio River, jurisdiction of commission 3462

Page.

Plant:
  Care and repair of, in charge of secretary 3528
    First and second districts 3614
    Third district 3667
    Fourth district 3730
  Inspection 3529
  New plant—
    First and second districts 3614
    Third district 3667
    Fourth district 3730
Plates:
  List of, accompanying report of secretary 3534
    First and second districts 3620
    Third district 3669
    Fourth district 3732
Project for works under Mississippi River Commission 3459
Policy of commission for work under flood-control act of Mar. 1, 1917 3462
Red, Atchafalaya, and Mississippi Rivers, junction of, operations, etc 3691
Revetments: Location, projects, operations, etc.:
  Arkansas River 3658
  Mississippi River, cost of, June 1, 1917, to May 31, 1918—
    First and second districts 3606
    Third district 3661
    Fourth district 3701
  Experimental 3607
  Operations during the year—
    First and second districts 3580, 3605
    Third district 3630, 3661
    Fourth district 3677, 3703
  Table showing effective length and amount built during the year 3468
River and harbor bill of Aug. 8, 1917, extracts from 3578
Statistics. (*See* Commercial Statistics.)
Subsistence, cost of, at dredge depot, West Memphis, Ark 3529
Surveys:
  Atchafalaya River 3467, 3522
  General 3467
  In connection with dredging operations 3524
  In the engineer districts—
    First and second districts 3614
    Third district 3666
    Fourth district 3728
  Project 3522
Tables. (*See also* Bars, Commercial Statistics, etc.)
  List of accompanying report of secretary 3533
Yazoo River, mouth of, and Vicksburg Harbor 3654

SUPERVISION OF THE HARBOR OF NEW YORK.

REPORT OF COMMODORE JAS. T. SMITH, UNITED STATES NAVY, RETIRED.

When I assumed the duties of supervisor of the harbor of New York on April 23, 1918, I found a well-organized and efficient office force and effective patrol system for the prevention of obstructive and injurious deposits within the harbor and its approaches and the adjacent waters so far as the number of patrol vessels available would allow.

2. NOTICES.

During the fiscal year notices in the form of copies of the law have been distributed from time to time for the information and guidance of all concerned.

3. SYSTEM OF CHECKING.

The following table shows deductions made on contracts for material escaping from dumpers while in transit or otherwise improperly disposed of or unaccounted for during the past fiscal year:

	Cubic yards.
United States Engineer Department	2,978
Department of docks and ferries	4,939
State of New York	1,741
United States Navy Department	905
Total	10,563

At an estimated average of 50 cents per cubic yard, amounting to $5,281.50.

Under contracts with above-noted departments 83 pocket loads, averaging 150 cubic yards each, or a total of 12,450 cubic yards, or approximately 20 scow loads, were checked upon reports of the patrol vessels as failing to clear at the proper point of deposit outside Scotland Lightship, and were kept under surveillance until returned to point of loading, to be remeasured before reloading. The illegal disposition of this amount of material would not only have proved a large item of gain to the contractor, but would eventually have caused much injury to the channels.

4. ENFORCEMENT OF THE ACT OF AUGUST 18, 1894.

The outside patrol vessels see to the enforcement of the provisions of this act, which requires the main channels to be kept free from small craft engaged in fishing or dredging for shellfish, or in any way interfering with the safe navigation of these channels by ocean steamships or other vessels of deep draft.

5. ENFORCEMENT OF THE ACTS OF MAY 28, 1908, AND FEBRUARY 16, 1909.

The strict surveillance kept over scows and vessels coming under the provisions of section 8 of the above act in relation to the equipment required to be carried on them eliminated the necessity for cases being referred for the action of the courts during the past year, except in one instance.

6. ENFORCEMENT OF REGULATIONS PRESCRIBED IN WAR DEPARTMENT BULLETIN OF OCTOBER 17, 1917.

On October 29, 1917, this office received a copy of a bulletin establishing a restricted area in the waters southeasterly from Sandy Hook, N. J., within which no vessel should enter or remain from sunrise to sunset, violations being deemed a misdemeanor punishable by fine or imprisonment and placing the enforcement of these regulations under the jurisdiction of the supervisor of the harbor.

On October 30, 1917, instructions were issued to the patrol vessels to warn all vessels approaching the restricted area and make written reports of violations.

A list of 78 vessels passing through the restricted area between October 25 and October 31 was forwarded to this office by the commanding officer of Sandy Hook Proving Ground, Fort Hancock, N. J. The reports were transmitted to the United States attorney, New York City, for such action as deemed proper, with the opinion—concurred in by the commanding officer, Sandy Hook Proving Ground—that proper notification had not been given to the seafaring public. They were subsequently transferred to the United States attorney for New Jersey, the violations coming within the jurisdiction of that judicial district.

From November 9, 1917, to May 31, 1918, the names of 76 vessels, together with the names of their masters, were forwarded to the United States attorney, Trenton, N. J., as having passed through the restricted area. In each of these cases information was forwarded to this office, executed, and returned to the United States attorney at Trenton for his further action. As no cases of vessels violating the restricted zone had been reported during the month of June, it would appear that the methods adopted in enforcing the regulations, together with the prompt action of the Department of Justice, are proving effective.

7. FLOATING PLANT.

Cost of operating patrol vessels fiscal year ending June 30, 1918.

	Vigilant.	Lamont.	Cerberus.	Scout.	Nimrod.	Lookout.	Total.
Salaries	[1] $7,389.35	$6,903.51	$7,899.04	$7,510.43	[2] $7,874.33	([3])	$37,576.66
Coal	6,387.35	2,759.50	4,987.25	5,091.36	4,051.65		23,277.11
Oil	231.27	213.73	294.94	212.47	256.03		1,208.44
Water	154.00	98.77	112.00	102.67	107.33		574.77
Subsistence	2,348.80	1,642.31	1,850.03	1,854.15	1,942.84	$215.70	9,853.83
Docking, repairs	1,291.04	3,436.62	125.82	1,613.98	2,136.70	143.00	8,747.16
Supplies	662.09	716.29	664.11	715.87	573.39	7.94	3,339.69
Gasoline						207.68	207.68
Total	18,463.90	15,770.73	15,933.19	17,100.93	16,942.27	574.32	84,785.34

---

[1] Deputy inspector and master of Vigilant salary charged to "Office expenses," 10 months, at $150 — $1,500

[2] Deputy inspector and master of Nimrod salary charged to "Office expenses," 2 months, at $140 — 280

[3] Deputy inspector and mate of Lookout salary charged to "Office expenses," 12 months, at $100 — 1 200

Total — 2,980

The sum of $75,000 was appropriated by the sundry civil act approved July 1, 1916, for the purchase or construction of a patrol vessel to take the place of the patrol vessel *Nimrod.* Efforts were made to obtain a suitable seagoing vessel by purchase or construction, but owing to abnormal conditions prevailing it was found impossible to obtain a suitable vessel within the limits of funds available. As explained in previous reports, only seagoing vessels should be acquired by this office hereafter. At present, tugs that tow scows to the dumping grounds outside Scotland Lightship are large seagoing vessels, and, having scows in tow, can make better weather in a seaway than a vessel without a tow, and it is essential that the patrol boats follow these tows to sea in all weathers. Although a seagoing vessel is needed, the power of a seagoing tugboat is not required. I earnestly concur in the recommendations of my predecessors that two of the oldest and now almost worn-out vessels of the patrol fleet be replaced by two new vessels at the earliest opportunity. However, owing to war conditions, the present time for purchase or construction of such vessels being utterly inopportune, I strongly urge that sufficient funds be made available to maintain the present fleet in a fairly seaworthy and serviceable condition and have accordingly included in the estimate the sum of $15,000 for that purpose. It seems to me a matter of economy that sufficient funds be made available to keep the vessels in reasonably serviceable condition for their operation during the present trying period. At the conclusion of the war many vessels will be on the hands of the Government, and two suitable for this service could be assigned for this duty.

Hire of dumpers and scows and towing charges to sea having increased over 100 per cent, together with the increased cost of labor in operating dredges and excavating material, proportionately increases incentive to dispose of the material surreptitiously; probably not directly by the owners or operators, but by their subordinates in their zealous efforts to keep an empty dumper alongside the dredge or empty scows alongside the dumping boards for reloading. It is therefore apparent that an efficient patrol by the vessels of this office was never more urgently needed than at the present time, the least relaxation being taken advantage of. The very nature of the material comprising the tows is a powerful incentive to get rid of it as quickly and at as little cost as possible, and emphasizes the drastic measures passed by Congress for the protection of the channel. From personal experience I am led to believe there is little patriotism where the final disposition of waste material is concerned. Therefore any relaxation of the activities of this office at this time would prove disastrous and the withdrawal of the patrol would result in irreparable injury to the channels of the harbor, becoming in about two months inaccessible to the largest transatlantic steamers.

The amount available for the maintenance and operation of the patrol fleet for the fiscal year 1919 is entirely inadequate to meet demands for the merely urgent repairs necessary to keep the vessels in serviceable condition during that year, due to the extraordinary increase in cost of labor and material in repairs and salaries to obtain licensed men for their operation. It is therefore earnestly recommended that some action be taken with a view to providing sufficient funds to enable this office to execute the absolutely necessary repairs to the patrol vessels to place them in running condition for operation in maintaining patrol duty during the fiscal year. Unless repaired they cannot be operated and the funds available for their operation will not admit of expenditure for repairs.

8. OFFICE.

Cost of operating under "Office expenses," fiscal year ending June 30, 1918.

Salaries[1]	$9.073.00
Stationery and printing	946.55
Traveling expenses	78.90
Incidentals, including telephone, telegrams, etc	154.11
Total	10,252.56

9. AMOUNT OF MATERIAL DEPOSITED.

MATERIAL DEPOSITED AT THE MOUTH OF THE HARBOR, UNDER SUPERVISION.

		Cubic yards.
From 1890 to 1917		313,863,175
Fiscal year 1918:		
Dredgings from Red Hook, Jamaica Bay, and other channels deposited under supervision of United States Army Engineers in an average depth of 80 feet of water in the neighborhood of Scotland lightship	399,643	
Other United States Government work	1,367,990	
Total resulting from Government work	1,767,633	
Other material	4,516,311	
Total for fiscal year 1918		6,283,944
Total from 1890 to 1918		320,147,119

MATERIAL DEPOSITED BEHIND BULKHEADS, UNDER SUPERVISION.

From 1890 to 1917	127,552,851
Fiscal year 1918	9,116,921
Total	136,669,772

DEPOSITED, UNDER SUPERVISION, CITY GARBAGE, AT BARREN ISLAND, FOR REDUCTION.

From date of operation of garbage-reduction plant in 1897 to June 30, 1917	5,052,782
Fiscal year 1918	69,100
Total	5,121,882

DEPOSITED IN HUDSON RIVER AT SUCH POINTS AS AGREED TO AFTER CONSULTATION WITH THE UNITED STATES DISTRICT ENGINEER OFFICER.

From 1907 to June 30, 1917	2,071,853
Fiscal year 1918	82,692
Total	2,154,545

Of this total amount, 865,530 cubic yards resulted from operations by the United States.

---

[1] Includes salary, deputy inspector and master patrol, vessel Vigilant, for 10 months, $1,500; deputy inspector and master, patrol vessel *Nimrod*, for 2 months, $280; deputy inspector and mate, *Lookout*, for one year, $1,200. Total $2,980.

DEPOSITED IN LONG ISLAND SOUND AND FISHERS ISLAND SOUND.

From 1890 to June 30, 1917	29,006,311
Fiscal year 1918	1,052,916
Total	30,059,227

DEPOSITED IN EAST RIVER, N. Y.

From 1890 to June 30, 1911, stone resulting from operations of the United States	197,991
Fiscal years 1916 and 1917, clay, sand, and stone over line of East River tunnels	1,307,431
Fiscal year 1918, clay, sand, and stone over line of East River tunnels	9,895
Total	1,515,317

Total amount deposited under supervision at sea, Long Island and Fishers Island Sounds, Hudson and East Rivers, and behind bulkheads, since establishment of office of supervisor to June 30, 1917	479,052,394
Total amount deposited during fiscal year 1918	16,615,468
Total	495,667,862

The records show that the amount of material moved upon the waters of the harbor of New York under the jurisdiction of the supervisor has increased from 9,711,141 cubic yards during the fiscal year 1890 to 18,739,424 and 16,615,468 cubic yards moved during the fiscal years ending June 30, 1917 and 1918, respectively.

The material moved during the past fiscal year, consisting of mud, sand, city refuse, garbage, cellar dirt, ashes, lime, and other débris, was deposited outside the harbor at properly designated places and behind bulkheads in the neighborhood of New York, as per the following recapitulation:

Place of deposit.	Kind of material.	Amount.
		Cu. yds.
Mouth of harbor outside of Scotland Lightship	Mud, sand, city refuse, etc	6,283,944
Long Island Sound	Mud, shells, etc	1,041,328
Fishers Island Sound	Mud, sand, and shells	11,588
East River	Clay, sand, and stone over line of tunnels	9,895
Hudson River	Sand and mud	82,692
Do	Mud, dirt, ashes, etc., behind bulkheads and on shore for filling.	382,855
East River	do	2,806,212
Harlem River	do	15,900
Passaic River	do	1,718,189
Rahway River	do	60,205
Shrewsbury River	do	15,926
Newark Bay	do	953,017
New York Bay	do	1,592,489
Gravesend Bay	do	76,418
Staten Island Sound	do	921,753
New York Bay (Central R. R. of New Jersey, Port Liberty, N. J.).	do	35,350
New York Bay (Pennsylvania R. R. Co., Greenville, N. J.).	do	44,500
Hackensack River	do	494,107
Barren Island	Garbage, dead animals, etc., ashore for reduction.	69,100
Total		16,615,468

The number of permits issued during the past fiscal year was 7.238; the average number of tows daily to sea was 18 and the average number of scows daily to sea was 28.

10. VIOLATIONS OF LAW.

(*A*) *Status of cases referred to the United States attorneys with recommendation that proceedings be instituted with a view to prosecution of the parties responsible, pending at end of fiscal year 1917, and action to end of fiscal year 1918.*

A synopsis of the following cases appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, pp. 3533, 3534, 3540, 3541, 3545, 3551, 3552, 3553, 3554, 3555, and 3556.)

No. 211. Tug "Gerry" and dumper "D. & I. No. 7."—March 23, 1918. The sum of $250 offered in compromise being accepted, order of discontinuance entered without costs. Case closed.

No. 231. Tug "Luther C. Ward" and dumper "C. D. 29."—December 5, 1917. Libel of information filed against tug and scow.

February 23, 1918. Final decree in favor of United States entered; principal $250, costs $22.45. Case closed.

No. 234. Tug "Bouker No. 2" and dumpers "No. 4–HH" and "Olympia."—December 5, 1917. Libel of information filed against tug and scows.

January 22, 1918. Final decree in favor of the United States against scow *No. 4–HH* entered in the sum of $250, and costs, $22.45; and a similar decree for the same amount against the scow *Olympia*. Case closed.

No. 271. Steamship "Barbarossa."—November 23, 1917. Final decree in favor of United States entered in the sum of $250, without costs. Case closed.

No. 262. Tug "P. J. T. Co. No. 7" and dumper "Olympia."—June 30, 1918. Case pending.

No. 264. Tug "Anna W." and dumper "D. & I. No. 5."—September 5. 1917. Libel of information filed against tug and scow.

January 8, 1918. Final decree in favor of United States entered; principal $250, costs $23.45. Case closed.

No. 266. Tug "P. J. T. Co. No. 7" and dumper "22 M. T. & T."—September 5, 1917. Libel of information filed against tug and scow.

May 16, 1918. Final decree in favor of United States entered for $250; no costs. Case closed.

No. 267. Tug "Joshua Lovett" and dumper "V–4."—January 8, 1918. Final decree entered in favor of United States; principal $250, costs $23.45. Case closed.

No. 268. Tug "Princess" and dumper "D. & I. No. 2."—September 5, 1917. Libel of information filed against tug and scow.

February 4, 1918. Final decree in favor of United States entered; principal $250, costs $23.30. Case closed.

No. 272. Tug "Anna W." and dumper "D. & I. No. 3."—November 2, 1917. Final decree in favor of United States entered in the sum of $250, and costs $23.35. Case closed.

No. 274. International Auto Repair Co.—June 30, 1918. Case pending.

No. 275. Tug "Anna W." and dumper "D. & I. No. 4."—March 13, 1918. Order of discontinuance entered, without costs. Case closed.

No. 276. Tug "Anna W." and dumpers "S–33" and "S–34."—September 14, 1917. Final decree in favor of United States entered; principal $250, costs $23.25. Case closed.

No. 277. Tug "O. L. Halenbeck" and dumpers "S–9" and "S–34."—September 14, 1917. Final decree in favor of United States entered; principal $250, costs $23.25. Case closed.

No. 278. Tug "Bismarck" and dumper "S–20."—September 14, 1917. Final decree in favor of United States entered in the sum of $250 and costs, $23.25. Case closed.

No. 280. Tug "Bismarck" and dumper "BB No. 19."—May 17, 1918. Final decree in favor of United States against scow "*BB No. 19*" entered in the sum of $250 and costs, $25. Case closed.

A synopsis of the following cases appeared in the Annual Report of the Chief of Engineers for 1917 (pp. 3667, 3668, 3669, 3670, 3671, 3672, 3673, and 3674):

No. 282. Tug "May McGuirl," dumpers "O-20" and "O-23."—February 6, 1917. Libel of information filed against the tug and scows.

December 20, 1917. Final decree entered in favor of the United States against scow *O-23* in the sum of $250 and costs, $23.45. Case closed.

No. 283. Tug "Joshua Lovett" and dumper "S-6."—February 6, 1917. Libel information filed against tug and scow.

January 23, 1918. Final decree in favor of United States entered in the sum of $250, without costs. Case closed.

No. 284. Tug "Leonard Richards" and dumper "S-6."—September 14, 1917. Final decree entered in favor of United States in the sum of $250 and costs, $23.55. Case closed.

No. 285. Tug "Gerry" and dumper "O-10."—December 20, 1917. Final decree in favor of United States against dumper *O-10* entered in the sum of $250 and costs, $23.55. Case closed.

No. 286. Tug "O. L. Halenback" and dumpers "O-21" and "O-22."—September 5, 1917. Libel of information against the tug and scows filed.

December 20, 1917. Final decree in favor of the United States entered against scow *O-21* in the sum of $250 and costs, $23.45; and a similar decree for the same amount against the scow *O-22*. Case closed.

No. 287. Tug "Juniata" and dumper "S-11."—June 30, 1918. Case pending.

No. 288. Tug "O. L. Halenbeck" and dumper "S-34."—December 24, 1917. Final decree in favor of United States entered in the sum of $250 and costs, $23.25. Case closed.

No. 289. Tug "Juniata" and dumpers "S-11" and "S-39."—September 5, 1917. Libel of information filed against tug and scows.

January 23, 1918. Final decree in favor of United States entered in the sum of $500, without costs. Case closed.

No. 290. Tug "O. L. Halenbeck" and dumper "D. & I. No. 1."—December 20, 1917. Final decree in favor of United States entered in the sum of $250 and costs, $23.45. Case closed.

No. 291. The Butterworth-Judson Corporation.—September 25, 1917. Plea of guilty entered. Company fined $500. Case closed.

No. 292. Tug. "Columbia" and dumper "CD No. 28."—June 30, 1918. Case pending.

No. 293. Tugs "Kate Jones" and "Minot I. Wilcox," dumpers "BB-17," "BB-18" and "BB-19."—September 5, 1917. Libels of information filed against tugs and scows.

June 11, 1918. Libels against tug *Minot I. Wilcox* and dumper *BB-18* and tug *Kate Jones* and dumper *BB-17* dismissed.

June 30, 1918. Case against tug *Kate Jones* and dumper *BB-19* pending.

No. 294. Tug "Susan A. Moran" and dumper "Cleary No. 1."—September 5, 1917. Libel of information filed against the tug and scow.

January 23, 1918. Final decree in favor of United States entered without costs, in the sum of $250. Case closed.

No. 295. Tug "Tasco" and dumpers "9X" and "13X."—September 5, 1917. Libel of information filed against tug and scows.

December 6, 1917. Final decree in favor of United States entered against each scow, in the sum of $250 and costs, $23.25, total $546.50. Case closed.

No. 296. British Steamship "Hannington Court."—June 30, 1918. Case pending.

No. 297. Tug "Bouker No. 2" and dumper "79-H."—July 27, 1917. Libel of information filed against tug and scow.

October 10, 1917. Final decree in favor of United States entered in the sum of $250, and costs, $23.35. Case closed.

No. 298. Tug "William H. Taylor," dumpers "43-M," "45-M," and "50-M."—July 30, 1917. Libel of information filed against the tug and scows.

May 16, 1918. Final decree in favor of United States against *43-M* entered in the sum of $250 and costs, $25.85; libels against tug and scows *45-M* and *50-M* dismissed. Case closed.

No. 299. Tug "Kate Jones" and dumper "BB-19."—September 5, 1917. Libel of information filed against tug and dumper.

May 17, 1918. Final decree in favor of United States entered in the sum of $250 and costs, $25.60. Case closed.

No. 300. Tugs "Kate Jones" and "Minot I. Wilcox," dumpers "BB No. 15" and "BB No. 16."—June 30, 1918. Case pending.

No. 301. Tug "Imperial," dumpers "S-11" and "S-33."—November 14, 1917. Libel of information filed against tug and scows.

May 16, 1918. Final decree in favor of United States entered in the sum of $250, without costs. Case closed.

No. 302. Tug "Princess" and dumper "S-34."—June 30, 1918. Case pending.

(*B*) *Synopsis of cases referred to the United States attorneys during the fiscal year ending June 30, 1918, and action to end of fiscal year 1918.*

No. 303. Tug "Susan A. Moran" and dumper "Cleary No. 1."—Owners of tug, Moran Towing & Transportation Co., 17 Battery Place, New York City; owners of dumper, Cleary Bros., 17 South Street, New York City.

Tug "*Susan A. Moran*" passed to sea on the morning of June 19, 1917, and was inspected while passing the Narrows bound out about 11.05 a. m., of that date, when her tow was found to consist of dumper *Cleary No. 1* having all pockets fully loaded with cellar dirt. The tow proceeded seaward, and upon reaching the designated dumping ground the contents of the dumper failed to clear. The tow returned to the harbor and was inspected while passing the Narrows bound in about 7.30 p. m. of that date, when dumper *Cleary No. 1* was found to have the first forward, forward middle, after middle, and first and second after pockets fully loaded, chains wound up. This dumper was left by the tug in the vicinity of Section 15, Erie Basin Breakwater, and was inspected by the *Vigilant* on June 20, when the load in the pockets were found to be in the condition as above stated. It appears, however, that about 2 a. m. of June 21, the scow sank at her moorings and the contents of the five pockets as above stated were illegally deposited in the tidal waters of the harbor.

On July 11, 1917, all the papers in the case were submitted to the United States attorney, New York City, with the following comment:

"Papers submitted show that the Moran Co. first endeavored to shift the responsibility to the estate of William Beard. This failing, they claimed that Cleary Bros. were responsible. * * * I consider the Moran Co. solely responsible for the illegal dumping, and believe they should be fined therefor and also obliged to dredge abreast section 15, Erie Basin. It seems to me that the United States Government should not be called upon to dredge such material, and although it may not form at this time an obstruction to navigation, it is nevertheless a deposit injurious to the channels of the harbor."

January 31, 1918, the papers were returned to the supervisor with the following decision:

* * * "Cleary Bros. in their letter to you of July 5, 1917, state that when the scow was brought back to Erie Basin she commenced to leak very badly; that thereafter, notwithstanding the fact that they had sent assistance to her and had two steam pumps working upon her, she filled and upset.

"Upon the facts, as above narrated, I do not see that any proceeding will lie against the tug, and in view of the efforts made by the owners of the scow to prevent her from sinking do not deem it wise to present this case to court for consideration."

* * * "The matter is therefore marked 'Closed.'" (C. 550.)

No. 304. Tug "Leonard Richards" and dumper "RR No. 16."—Owners of tug, Cahill Towing Line, 140 Broad Street, New York City; owners of dumper *RR No. 16*, Robert Rogers, 82 Beaver Street, New York City.

The tug *Leonard Richards* passed to sea on the morning of June 29, 1917, and was inspected while passing the Narrows bound out about 7.30 a. m. of that date, when her tow was found to consist of dumper *RR No. 16*, which had the first forward pocket about half loaded and the five other pockets fully loaded with clean soil and stone. At about 9.45 a. m. fog shut in, and although two vessels were keeping a lookout over the dumping ground, the *Leonard Richards* with her tow was not reported as passing Scotland Lightship. At about 11.55 a. m., however, the *Leonard Richards* and her tow were sighted and inspected while passing Coney Island Point bound in, when dumper *RR No. 16* was found to be entirely empty. From the lapse of time indicated as above it is evident that this tug and tow could not have reached the designated dumping ground and return to Coney Island Point. Hence it is equally evident that the contents of *RR No. 16* were illegally deposited in the waters of the harbor.

July 11, 1917, all the papers forwarded to the United States attorney, New York City.

September 8, 1917, libel of information filed against the tug and scow.

February 7, 1918, final decree in favor of the United States was entered against the tug in the sum of $250 and costs, $23.45. Case closed. (C. 551.)

No. 305. Tug "Anna W." and dumpers "CD No. 20" and "CD No. 22."—Owners of tug, Cahill Towing Line, 140 Broad Street, New York City; owners of dumpers, Coastwise Dredging Co., 17 Battery Place, New York City.

The tug *Anna W.* passed to sea on the afternoon of July 9, 1917, and was inspected while passing the Narrows bound out at 4.05 p. m. of that date, when her tow was found to consist of dumpers *CD No. 20* and *CD No. 22*, both having all pockets loaded with mud and derrick rock. The tow proceeded seaward and was again inspected while bound ont at a point about 2 milets southeast by east of Scotland Lightship at about 11 p. m., when dumper *CD No. 20* was found to have the forward middle pocket about three-fourths loaded and 5 pockets entirely empty; dumper *CD No. 22* had the first forward pocket about three-fourths loaded and 5 pockets entirely empty. It therefore seemed clear that the material loaded into 10 of the pockets of the above-specified dumpers had been illegally deposited in the waters of the harbor at some point between the Narrows and the point of inspection last stated.

August 2, 1917, all the papers in the case submitted to the United States attorney, New York, for his action.

State engineer and surveyor, State of New York, advised of the facts for such action as he may deem proper in regard to payment for material not disposed of in accordance with law and contract.

August 29, 1917, department of State engineer and surveyor, State of New York, advised this office that 1,026 cubic yards, at $1.48 per cubic yard, $1,518.48, had been deducted from contractor's estimate for work done during the month of July.

September 8, 1917, libels of information filed against the tug and scows.

January 2, 1918, final decree in favor of United States entered against dumper *CD No. 20* in the sum of $250 and costs, $23.30; and on the same day a similar decree for the same amount was entered against dumper *CD No. 22*; libel against the tug dismissed. Case closed. (C. 556.)

No. 306. Tug "Anna W." and dumper "S-34."—Owners of tug, Cahill Towing Line, 140 Broad Street, New York City; owners of dumper, P. Sanford Ross, Inc., 277 Washington Street, Jersey City, N. J.

The tug *Anna W.* passed to sea on the evening of July 31, 1917, and was inspected while passing the Narrows bound out about 10.30 p. m., when her tow was found to consist of dumpers *RR No. 8* and *S. 34*, both having all pockets fully loaded with mud.

The tow proceeded seaward and was again inspected while bound out at a point about 1¼ miles east-southeast of Scotland Lightship, at about 2.15 a. m., August 1, 1917, when dumper *S-34* was found to have all pockets entirely empty. It is therefore evident that the entire contents of this dumper had been illegally deposited in the waters of the harbor, between the Narrows and the point of inspection last stated.

August 11, 1917, all the papers in the case were transmitted to the United States attorney, New York City.

December 5, 1917, libel of information filed against the tug and dumper *S-34*.

May 6, 1918, final decree in favor of United States entered in the sum of $250; no costs. Case closed. (C. 559.)

No. 307. Contracting firm of Damato & Miele, 27 Frost Street, Brooklyn, N. Y.—August 6, 1917, attention of this firm was directed to complaints being made to this office in effect that a large percentage of garbage was allowed to go overboard into the tidal waters of Jamaica Bay at the foot Alexander Avenue, Arverne, Long Island, during the process of loading scows at that point, and that considerable of the material is carried off by the action of the tide to be thrown up on neighboring beaches. In response to this letter one of the members of the firm of Damato & Miele appeared at this office personally, when the promise was made by him that they would remedy the cause of complaint at once. It appears, however, that up to August 18 this firm had evidently made no effort to abate the nuisance, but continued to violate the law in the manner stated.

August 20, 1917, all the papers in the case forwarded to the United States attorney, New York City, for such action as he may deem proper.

August 23, 1917, the United States attorney, New York City, in acknowledging receipt of these papers, stated: "Inasmuch as this offense was committed within the jurisdiction of the eastern district, I have forwarded them to the United States attorney in Brooklyn for his consideration."

June 30, 1918, case pending. (C. 562.)

No. 308. Tug "Anna W." and dumpers "BB No. 14" and "BB No. 57."—Owners of tug, Cahill Towing Line, 140 Broad Street, New York City; owners of dumpers, G. H. Breymann & Bros., 17 Battery Place, New York City.

The tug *Anna W.* passed to sea on the morning of August 9, 1917, and was inspected while passing the Narrows bound out at 1.40 a. m. of that date, when her tow was found to consist of two dumpers, *BB No. 14* with all pockets fully loaded, and *BB No. 57* with nine pockets loaded and one pocket (third forward) empty. The tow proceeded seaward and was again inspected while bound out at a point about 1¾ miles east-southeast of Scotland Lightship, when *BB No. 14* was found to have four pockets empty, while *BB No. 57* had two pockets empty. It, therefore, seems clear that the material loaded into four pockets of *BB No. 14* and one pocket of *BB No. 57* had been illegally deposited in the waters of the harbor, between the Narrows and the point of inspection last stated.

August 17, 1917, all the papers in the case forwarded to the United States attorney, New York City.

August 18, 1917, district engineer officer, first district, New York City, advised of the facts for such action as he may deem proper in regard to payment for material not deposited in accordance with contract.

August 21, 1917, district engineer, first district, New York City, advised this office that the material illegally dumped would not be paid for by the United States.

November 27, 1917, libel of information filed against tug and scows.

May 17, 1918, final decree in favor of United States entered against scow *BB No. 14* in the sum of $250 and costs, $23.85; and on the same date a similar decree for the same amount was entered against scow *BB No. 57*. Case closed. (C. 563.)

No. 309. Tug "Bismarck" and dumper "D. & I. No. 4."—Owners of tug, Cahill Towing Line, 140 Broad Street, New York City; owners of dumper, Dailey & Ivins, 21 Park Row, New York City.

The tug *Bismarck* passed to sea on the morning of August 8, 1917, and was inspected while passing the Narrows bound out about 1 a. m. of that date, when her tow was found to consist of dumper *D. & I. No. 4* with all pockets fully loaded with ashes and sweepings. The tow proceeded seaward and was again inspected while bound out at a point about 2 miles southeast of Scotland Lightship at 7.40 a. m., when dumper *D. & I. No. 4* was found to have four pockets empty, chains of the empty pockets all unwound and the pawls knocked out. It therefore seems clear that the material loaded into the above designated pockets had been illegally deposited in the waters of the harbor at some point between the Narrows and the point of inspection last stated.

August 16, 1917, all the papers in the case forwarded to the United States attorney, New York City.

December 5, 1917, libel of information filed against the tug and scow.

March 23, 1918, order of discontinuance without costs entered, an offer in compromise of $250 having been accepted pursuant to authority of Attorney General dated March 20, 1918. Case closed. (C. 565.)

No. 310. Tug "Joshua Lovett" and dumper "Mulligan No. 2."—Owners of tug, Taylor Dredging Co., Jersey City, N. J.; owner of dumper, J. G. Mulligan, foot West Thirty-ninth Street, New York City.

The tug *Joshua Lovett* passed to sea on the evening of August 14, 1917, and was inspected while passing the Narrows bound out about 10 p. m. of that date, when her tow was found to consist of dumper *Mulligan No. 2* having all pockets fully loaded with cellar dirt. This tow proceeded seaward and was again inspected while bound out at a point 1½ miles southeast by east of Scotland Lightship at 1.05 a. m. of August 15, when dumper *Mulligan No. 2* was found to have four pockets empty. It therefore seems clear that the contents of the above specified pockets had been illegally deposited in the waters of the harbor at some point between the Narrows and the point of inspection last stated.

August 20, 1917, all the papers in the case forwarded to the United States attorney, New York City.

December 5, 1917, libel of information filed against tug and scow.

February 26, 1918, final decree by confession against the scow entered, made up as follows: Principal $250, costs $2.52. Case closed. (C. 566.)

No. 311. Tug "Anna W." and dumper "D. & I. No. 7."—Owners of tug, Cahill Towing Line, 140 Broad Street, New York City; owners of dumper, Dailey & Ivins, 21 Park Row, New York City.

The tug *Anna W.* having in tow dumpers *D. & I. Nos. 3* and 7 passed to sea on the evening of August 18, 1917, and was inspected while passing the Narrows bound out at 11.55 p. m. of that date, when both dumpers were found to be fully loaded with ashes and sweepings. The tow proceeded seaward and was again inspected while bound out at a point about 2⅜ miles east-southeast of Scotland Lightship at 3.45 a. m. of August 19, when dumper *D. & I. No.* 7 was found to have all of her eight pockets entirely empty. It therefore seems clear that the entire contents of the load of dumper *D. & I. No.* 7 had been illegally deposited in the waters of the harbor, between the Narrows and point of inspection last stated.

August 28, 1917, all the papers in the case forwarded to the United States attorney, New York City.

December 5, 1917, libel of information filed against tug and scow.

March 23, 1918, order of discontinuance entered without costs, the offer in compromise of $250 having been accepted pursuant to authority of Attorney General. Case closed. (C. 567.)

No. 312. Tug "Susan A. Moran."—Moran Towing & Transportation Co., owners, 17 Battery Place, New York City.

Report by deputy inspector and mate of the patrol vessel *Cerberus* that the tug *Susan A. Moran*, having in tow two dumpers, bound out to the dumping grounds, dumped steam ashes overboard from the tug in the main channel off the Quickstep bell buoy at 12.55 p. m. of August 21, 1917.

August 29, 1917, all the papers submitted to the United States attorney, New York City.

June 30, 1918, case pending. (C. 568.)

No. 313. Tug "Pencoyd."—Port Reading Railroad Co., Port Reading, N. J., owners.

Report by the mate in charge of patrol launch *Lookout* that the crew of the *Pencoyd* dumped ashes into the channel of Staten Island Sound, from Elizabethport to Shooters Island, at 1.15 p. m. of August 29, 1917.

September 7, 1917, all the papers in the case forwarded to United States attorney, New York City.

December 6, 1917, libel of information filed against the tug.

May 17, 1918, final decree against the tug entered for $250, without costs. Case closed. (C. 571.)

No. 315. Tug "Agnes A. Moran" and dumper "No. 7 X."—Owners of tug, Moran 17 Battery Place, New York City, owners of tug and dumper.

The tug *Columbia* passed to sea on the morning of September 8, 1917, and was inspected while passing the fort bound out about 3.35 a. m., when her tow was found to consist of dumper *CD No. 29* having all pockets fully loaded with mud and sand. This tow proceeded seaward and was again inspected while bound out at a point about 1½ miles east one-half north of Scotland Lightship at about 9 a. m. of that date, when dumper *CD No. 29* was found to have five of her pockets entirely empty. It therefore seems clear that the contents of five pockets of this scow were illegally deposited in the waters of the harbor at some point between the fort and the point of inspection last stated.

September 24, 1917, all the papers in the case forwarded to the United States attorney, New York City.

December 5, 1917, libel filed against tug and scow.

February 23, 1918, final decree against the scow entered for $250 and costs, $22.45. Case closed. (C. 572.)

No. 315. Tug "Agnes A. Moran" and dumper "No. 7 X."—Owners of tug, Moran Towing & Transportation Co., 17 Battery Place, New York City; owners of dumper, William Beard & Co., 59 Pearl Street, New York City.

The tug *Agnes A. Moran* passed to sea on the morning of September 15, 1917, and was inspected while passing the Narrows bound out at 11.20 a. m. of that date, when her tow was found to consist of dumpers *6–X* and *7–X*.fully loaded with mud. In the pockets of *No. 6–X* were three logs, approximately 20 feet long, and in *7–X* one log about the same length. The tow proceeded seaward and was again inspected while bound out at a point about 1 mile east of Scotland Lightship at about 4.20 p. m. of that date, when two pockets of dumper *7–X* were illegally deposited, the scowman claiming that the scow was leaking badly, and as a matter of fact about 4.40 p. m. the dumper began to list dangerously and the patrol vessel had to take the man off the dumper.

This was at a point about 2¾ miles east-southeast of the light vessel, at which point the dumper capsized and discharged the remainder of the load.

September 26, 1917, all the papers in the case forwarded to the United States attorney, New York City, for his consideration, inviting attention to the fourth paragraph of the permit for this tow, which expressly stated "that under no circumstances will a permit be granted for the deposit of heavy floatable material, such as spiles, dock timbers, etc., in the waters under the jurisdiction of this office." The supervisor also expressed the opinion that the scow was unseaworthy when they started seaward and that the towing vessel showed poor judgment in proceeding to sea in the then prevailing conditions of weather.

June 30, 1918. Case pending. (C. 573.)

No. 316. Tug "May McGuirl" and navy yard scow "No. 2."—New York Harbor Towboat Co., 17 State Street, New York City, owners of the tug.

The tug *May McGuirl* passed to sea on the afternoon of September 16, 1917, having in tow navy yard dumper *No. 2* loaded with refuse. This tow was sighted passing out the inner entrance to Gedney Channel at about 1.10 p. m. of that date, at which point the dumper was found to be fully loaded. At about 2.30 p. m., while this tow was at a point about 1 mile north of Scotland Lightship, the *May McGuirl* signaled with the steam whistle to dump the contents of her tow, and the dumper was accordingly illegally discharged at that point.

November 5, 1917, all the papers in the case forwarded to the United States attorney, New York City, the supervisor stating he was of the opinion that the master of this tow showed poor judgment in proceeding to sea in the face of a northeast blow and a heavy sea.

November 27, 1917, libel of information filed against the tug.

May 16, 1918, final decree in favor of United States entered in the sum of $250 and costs, $25.30. Case closed. (C. 574.)

No. 317. Tug "Agnes A. Moran" and dumper "13-X."—Owners of tug, Moran Towing & Transportation Co., 17 Battery Place, New York City; owners of dumper, William Beard & Co., 59 Pearl Street, New York City.

The tug *Agnes A. Moran* passed to sea on the morning of September 22, 1917, having in tow dumper *13-X* loaded with mud. This tow was inspected while passing the Narrows bound out about 2.45 a. m. of that date, when dumper *13-X* was found to have five pockets fully loaded and one pocket about half loaded. The tow proceeded seaward and was again inspected while bound out at a point about 1¼ miles east of Scotland Lightship at 6.30 a. m., when dumper *13-X* was found to be entirely empty. It therefore seems clear that the entire contents of this dumper had been illegally deposited in the waters of the harbor, between the Narrows and the point of inspection last stated.

October 4, 1917, all papers in the case forwarded to United States attorney, New York City.

December 5, 1917, libel filed against tug and scow.

February 23, 1918, final decree entered in favor of the United States in the sum of $250 and costs, $22.45. Case closed. (C. 575.)

No. 318. Tug "Joshua Lovett," dumpers "2 and 11-H."—Taylor Dredging Co., Jersey City, N. J., owners of tug and dumpers.

The Tug *Joshua Lovett* passed to sea on the evening of September 24, 1917, and was inspected while passing Gedney Channel at 6.10 p. m., when her tow was found to consist of two dumpers, *Nos. 2* and *11-HH* loaded with mud. It was raining at the time, wind east about 13 miles per hour, and a heavy sea running. At 6.20 p. m. the scowmen on these scows dumped their contents about one-quarter of a mile southeast of Gedney Channel in the South Channel. The master of patrol vessel *Cerberus* arrested the scowmen, who claimed they dumped the scows to save them from sinking.

November 27, 1917, libel of information filed against tug and scows.

January 22, 1918, final decree in favor of United States entered against Scow *No. 2-HH*, penalty $250; costs $22.55; and a similar decree entered for the same amount against scow *No. 11-HH*. Case closed. (C. 576.)

No. 319. Tug "J. J. McGuirl" and navy yard scow "No. 2."—New York Harbor Towboat Co., 17 State Street, New York City, owners of the tug.

The tug *J. J. McGuirl* passed to sea on the morning of October 1, 1917, and was inspected while passing the Narrows bound out at 11.10 a. m. of that date, when her tow was found to consist of dumper *No. 2* loaded with refuse. The tow proceeded seaward and upon arriving at a point about 3 miles east southeast of Scotland Lightship at 2.20 p. m. of that date, illegally deposited the entire contents of the dumper in the waters of the harbor.

November 5, 1917, all the papers in the case forwarded to the United States attorney, New York City.

January 30, 1918, papers returned with the following opinion by the United States attorney, New York City:

"That the evidence in this case is not sufficient to warrant the filing of a libel against the tug *J. J. McGuirl;* and inasmuch as the offending scow is property of the United States, a libel can not be filed against it."

Case closed. (C. 577.)

No. 320. Tug "Agnes A. Moran" and dumper "Mercury."—Moran Towing & Transportation Co, 17 Battery Place, New York, owners of tug; and Cullen Transportation Co, 17 Battery Place, New York, owners of the dumper.

The tug *Agnes A. Moran* passed to sea on the morning of October 20, 1917, and was inspected while passing the Narrows bound out at 2.10 a. m. of that date, when her tow was found to consist of dumper *Mercury* with all pockets fully loaded with cellar dirt. This tow was again inspected while bound out at a point about 2 miles southeast of Scotland Lightship at about 6.10 a. m. of that date, when dumper *Mercury* was found to have the after middle pocket empty. It therefore seems clear that the material loaded in the above designated pocket had been illegally deposited in the waters of the harbor at some point between the Narrows and the point of inspection last stated.

November 16, 1917, all the papers in the case forwarded to the United States attorney, New York City.

December 5, 1917, libel filed against tug and scow.

February 23, 1918, final decree in favor of United States entered against the scow, penalty $250, costs $22.45. Case closed. (C. 581.)

No. 321. Tug "J. W. Scott" and dumpers "CD 19" and "23."—Thomas F. Guidera, 30 Church Street, New York City, owner of tug; Coastwise Dredging Co., 17 Battery Place, New York City, owners of dumpers.

The tug *J. W. Scott* passed to sea on the afternoon of October 22, 1917, and was inspected while passing the Narrows bound out at 2.10 p. m. of that date, when her tow was found to consist of dumpers *CD No. 19* and *CD No. 23*, both dumpers having all pockets fully loaded with mud. The tow proceeded seaward and was again inspected while bound out at a point about 2½ miles southeast of Scotland Lightship about 6.35 p. m., when all pockets in *CD No. 19* were found to be entirely empty, and four middle pockets of *CD No. 23* were also empty. It would therefore appear that the material loaded into the above-designated pockets had been illegally deposited in the waters of the harbor at some point between the Narrows and the point of inspection last stated.

November 5, 1917, all the papers forwarded to the United States attorney, New York City.

November 13, 1917, libel filed against tug and scows.

January 17, 1918, final decree in favor of United States against the scow *CD No. 19* entered in the sum of $250 and costs, $22.45; and on the same date a similar decree against scow *CD No. 23* for the same amount. Case closed. (C. 584.)

No. 322. Tug "Bismarck" and dumper "CD No. 22."—Owners of the tug, Cahill Towing Line, 140 Broad Street, New York City; owners of the dumper, Coastwise Dredging Co., 17 Battery Place, New York City.

The tug *Bismarck* passed to sea on the afternoon of October 23 and was inspected while passing the Narrows bound out about 4.55 p. m. of that date, when her tow was found to consist of two dumpers, *RR No. 20* having all pockets fully loaded with mud and *CD No. 22* having five pockets loaded with mud, one pocket being empty. The tow proceeded seaward, and failing to reach the designated dumping ground, returned to the harbor and was inspected while passing the Narrows bound in, when dumper *RR No. 20* was found to have all pockets fully loaded, while *CD No. 22* had all pockets entirely empty. It therefore seems clear that the contents of dumper *CD No. 22* had been illegally deposited in the waters of the harbor, between the Narrows and the point of Sandy Hook.

November 5, 1917, all the papers in the case forwarded to the United States attorney, New York City.

November 14, 1917, libel filed against the tug and scow.

February 23, 1918, final decree in favor of United States entered against the scow in the sum of $250 and costs, $22.45. Case closed. (C. 585.)

No. 323. Tug "Susan A. Moran" and dumper "7-X."—Owners of tug, Moran Towing & Transportation Co., 17 Battery Place, New York City; owners of dumper, William Beard & Co., 59 Pearl Street, New York City.

The tug *Susan A. Moran* passed to sea on the afternoon of October 27 and was inspected while passing the Narrows bound out about 8.35 p. m. of that date, when her tow was found to consist of dumpers *Nos. 4-X*, *6-X*, and *7-X*, each dumper having all pockets fully loaded with mud. The tow, failing to reach the designated dumping ground, returned to the harbor and was inspected while passing the Narrows bound in about 4.15 a. m., of the 28th, when dumpers *4-X* and *6-X* were found to have all pockets fully loaded, while *No. 7-X* had all pockets entirely empty. It therefore seems clear that the entire contents of dumper *7-X* had been illegally deposited in the waters of the harbor.

November 9, 1917, all the papers in the case forwarded to the United States attorney, New York City.

November 27, 1917, libel filed against the tug and scow.

February 23, 1918, final decree in favor of United States entered in the sum of $250 and costs, $22.45. Case closed. (C. 587.)

No. 324. Tug "Bismarck," dumpers "CD 19" and "CD 22."—Owners of tug, Cahill Towing Line, 140 Broad Street, New York City; owners of dumpers, Coastwise Dredging Co., 17 Battery Place, New York City.

The tug *Bismarck* passed to sea on the morning of October 29, 1917, and was inspected while passing the Narrows bound out about 10.20 a. m., when her tow was found to consist of *CD 19* and *CD 22*. *No. 19* had all pockets fully loaded; *No. 22* had five pockets fully loaded and one pocket empty. This tow was again sighted while bound out at a point about 1⅝ miles southeast of Scotland Lightship at 3 p. m., at which point the towing vessel blew the signal for the scowmen to dump the scows, and the contents thereof were accordingly illegally deposited at that point, except two pockets of dumper *CD 19*, which failed to clear. The tow returned to the harbor and was inspected while bound in at a point about 1 mile southeast of Scotland Light Vessel, when two pockets of *CD 19* were found to be half loaded. The tow continued toward the harbor and was again inspected while passing the Narrows bound in about 7.15 p. m., when both dumpers were found to be entirely empty.

November 9, 1917, all the papers in the case forwarded to the United States attorney, New York City.

June 30, 1918, case pending. (C. 588.)

No. 325. Tug "Princess," dumpers "O-20" and "O-21."—Owners of tug, Cahill Towing Line, 140 Broad Street, New York City; owners of dumpers, R. G. Packard Co., Bayonne, N. J.

The tug *Princess* passed to sea on the afternoon of October 26, 1917, and was inspected while passing the Narrows bound out about 7.30 p. m. of that date, when her tow was found to consist of dumpers *O-20* and *O-21*, each having all pockets fully loaded with mud. This tow was again inspected while bound out at a point about 1¾ miles southeast of Scotland Lightship, at 12.40 a. m. of October 27, when both dumpers were found to be entirely empty. It therefore seems clear that the contents of these dumpers had been illegally deposited in the waters of the harbor at some point between the Narrows and the point of inspection last stated.

November 12, 1917, all the papers in the case forwarded to the United States attorney, New York City.

November 21, 1917, libels of information filed against the tug and scows.

February 28, 1918, final decree against scow *O-20* entered in the sum of $250, costs, $22.50, and a similar decree against scow *O-21* for the same amount entered on the same day. Case closed. (C. 586.)

No. 326. Tug "J. W. Scott," and dumper "Sea Bird."—Thomas F. Guidera, 50 Church Street, New York City, owner of tug; O'Brien Bros., Inc. 80 South Street, New York City, owners of dumper.

The tug *J. W. Scott* passed to sea on the morning of October 18, 1917, and was inspected while passing the Narrows bound out at 12.40 p. m. of that date, when her tow was found to consist of dumper *Sea Bird* with all pockets fully loaded with cellar dirt. The tow proceeded seaward and was again inspected while bound out at a point 3 miles southeast of Scotland Lightship at 6 p. m., when dumper *Sea Bird* was found to have the second forward pocket entirely empty. It would therefore appear that the contents of one pocket of this dumper had been illegally deposited in the waters of the harbor between the Narrows and the point of inspection last stated.

November 3, 1917, all the papers in the case forwarded to the United States attorney.

November 14, 1917, libel filed against tug and scow.

January 17, 1918, final decree was entered against the scow in the sum of $250 and costs $22.45. Case closed. (C. 582.)

No. 327. Tug "Bouker No. 2" and dumper "77-H."—Bouker Contracting Co., 17 State Street, New York City, owners of tug and dumper.

The tug *Bouker No. 2* passed to sea on the afternoon of November 16, 1917, and was inspected while passing the Narrows bound out at 12.40 p. m. of that date, when her tow was found to consist of dumper *No. 77-H* having all pockets fully loaded with cellar dirt. The tow proceeded seaward and was again inspected at a point about 2 miles east-southeast of Scotland Lightship while bound out, about 4 p. m., when dumper *No. 77-H* had the after middle pocket empty. It therefore seems clear that the contents of the above designated pocket had been illegally deposited in the waters of the harbor between the Narrows and the point of inspection last stated.

December 4, 1917, all the papers in the case forwarded to the United States attorney, New York City.

December 12, 1917, libel filed against tug and scow.

February 23, 1918, final decree entered in favor of United States; principal $250, costs $22.45. Case closed. (C. 593.)

No. 328. Tug "Imperial" and dumper "CD 19."—Cahill Towing Line, 140 Broad Street, New York City, owners of tug; Coastwise Dredging Co., 17 Battery Place, New York City, owners of dumper.

The tug *Imperial* passed to sea on the morning of December 13, 1917, and was inspected while passing the Narrows bound out at 11.30 a. m., when her tow was found to consist of dumper *CD No. 19* with all pockets fully loaded with mud. The tow proceeded seaward and was again inspected while bound out at a point about 1 mile east by north of Scotland Lightship at 4 p. m., at which point the scowman was seen to signal the tug by waving his hand, and the tug immediately began to turn about, the scowman discharging the contents of the dumper at that point.

December 18, 1917, all the papers in the case forwarded to the United States attorney, New York City, with the following comments:

"From these papers it is apparent that the tow was making very bad weather on account of the heavy sea running, and in this connection I especially invite your attention to the letter from the Cahill Towing Co., in which the correctness of the patrol vessel's report is admitted. I therefore submit that the tug *Imperial*, having towed scow *CD No. 19* out of the harbor against an east-southeast gale and a heavy sea to a position 1 mile east by north of Scotland Lightship, where the conditions were such that the scowman must either dump or drown, was absolutely responsible for the illegal dumping.

"I am further of the opinion that had the scowman been drowned the tug *Imperial* ought to be held liable for manslaughter."

December 18, 1917, department docks and ferries, New York City, advised of facts for such action as deem proper in regard to payment for material not disposed of in accordance with law and contract.

December 26, 1917, advised by department docks and ferries that 969 cubic yards of dredged material had been deducted from amount due the contractor, contents of dumper *CD No. 19* illegally dumped on December 13, 1917.

January 10, 1918, libel filed against tug and scow.

March 18, 1918, final decree, pro confesso, entered against the tug, made up as follows: Principal $250, costs $22.30. Libel as to scow dismissed. Case closed. (C. 596.)

No. 329. Tug "Joshua Lovett," dumper "V-5."—Taylor Dredging Co., Jersey City, N. J., owners of tug; J. & J. McSpirit, Jersey City, N. J., owners of dumper.

The tug *Joshua Lovett* passed to sea December 12, 1917, and was inspected while passing the Narrows bound out at 8.10 p. m. of that date, when her tow was found to consist of dumper *V-5* having all pockets fully loaded with mud. The tow proceeded seaward, but failed to reach the designated dumping ground and returned to the harbor without her tow, dumper *V-5* with her entire load having sunk between the Lump Buoy and the Fairway Buoy of the South Channel.

January 14, 1918, all the papers in the case forwarded to the United States attorney, New York City, with the following comment:

"I am of the opinion that the illegal deposit of the material and the loss of the scow was due to the severe conditions of weather prevailing at the time the tow ventured seaward and probably to careless and improper handling."

February 9, 1918, papers returned by United States attorney; insufficient evidence to warrant successful prosecution. Case closed. (C. 597.)

No. 330. New York Steam Co.—Reported by Deputy Inspector Peter Nelson, master of the patrol vessel *Vigilant;* that this company's employees on January 5, 1918, dumped ashes through a hole in the bridge that reaches from their works to the dock at the foot of East Fifty-ninth Street, the ashes passing through this hole landing on the steep bank and sliding from there into the East River.

January 7, 1918, papers in the case forwarded to the United States attorney, New York City.

June 30, 1918, case pending. (C. 599).

No. 331. Tug "Ariosa" and dumper "20–D."—Henry DuBois' Sons Co., 17 State Street, New York City, owners of tug and dumper. The tug *Ariosa* passed to sea on the morning of December 21, 1917, and was inspected while passing the Narrows bound out at 3.10 a. m. of that date, when her tow was found to consist of dumper *20–D* fully loaded with mud. The tow proceeded seaward, and upon reaching a point about 2½ miles southeast by east of Scotland Lightship the British steamer *Eurybates* bound in collided with dumper *20–D*, and the master of the *Ariosa* signaled to the scowman to dump the scow, and the contents of the dumper were accordingly illegally dumped at that point.

January 14, 1918, all the papers in the case forwarded to the United States attorney, New York City, stating "As nothing appears in the accompanying preliminary survey of the damage sustained by dumper *20–D* to justify the illegal deposit of its contents, I submit all the papers in the case for your consideration and such action as you may deem advisable."

January 30, 1918, papers returned by the United States attorney, stating "I am of the opinion that the papers submitted by you to me are not sufficient to warrant the institution of proceedings against the vessels named."

Case closed. (C. 598).

No. 332 Tug "Virginian."—Southern Transportation Co., of Philadelphia, owners.

On January 14, 1918, the tug *Virginian* was observed near the ash scow furnished by the city for the reception of ashes from small craft plying the harbor and anchored off Bedloes Island for that purpose, and at 2.40 p. m. the master of the patrol vessel *Vigilant* saw the crew of the *Virginian* deposit ashes from the tug in the tidal waters of the harbor between the tug and the ash scow.

January 18, 1918, the papers in the case forwarded to the United States attorney, New York City.

February 6, 1918, papers returned by United States attorney, stating in view of conflicting evidence, he did not feel that a sufficiently clear violation of law has been proved to warrant arrest and prosecution of the parties committing the act at that date. Case closed. (C. 600.)

No. 333. Steamship "Moorish Prince."—Complaint received by supervisor, signed by four of crew, that the steamship *Moorish Prince* dumped ashes overboard while lying at anchor in the Narrows on November 24 and 25, 1917, and forwarded to United States attorney, New York City, January 19, 1918.

February 7, 1918, investigation of complaint having been made, United States attorney is of opinion no libel should be filed. Case closed. (C. 601.)

No. 334. Tug "B. T. Haviland," dumpers "BB No. 9" and "BB No. 17."—G. H. Breymand & Bros., 17 Battery Place, New York City, owners of tug and dumpers.

The tug *B. T. Haviland* passed to sea on the afternoon of February 1, 1918, and was inspected while passing the Narrows bound out, when her tow was found to consist of dumpers *BB No. 9* and *BB No. 17* with all pockets loaded with mud. The tow proceeded seaward and was again inspected while bound out at 3.45 p. m. of that date at a point about one-half mile east of Scotland Lightship, when four pockets in *BB No. 9* and four pockets in *BB No. 17* were found to be empty. It therefore seems clear that the contents of four pockets in each of these dumpers had been illegally deposited in the waters of the harbor between the Narrows and the point of inspection last stated.

February 11, 1918, all the papers in the case forwarded to the United States attorney, New York City.

March 12, 1918, libel of information filed against the tug and scows.

June 30, 1918, case pending. (C. 602.)

No. 335. Tug "Agnes A. Moran," dumpers "4-X" and "15-X."—Owners of tug, Moran Towing & Transportation Co., 17 Battery Place, New York City; owners of dumpers, William Beard & Co., 59 Pearl Street, New York City.

The tug *Agnes A. Moran* passed to sea on March 7, 1918, and was inspected while passing the fort bound out at 5.10 a. m. of that date, when her tow was found to consist of dumpers *4-X* and *15-X*, both dumpers having all pockets fully loaded with mud. The tow proceeded seaward and was again inspected when in the Swash Channel, bound out, about 7.45 a. m., and *15-X* at that time was seen to have the port side under water. The master of the towing vessel was then notified of the condition of this dumper, and turned around in order to return to the harbor. During this maneuver the contents of both dumpers were illegally deposited in the waters of the harbor at the entrance to the South Channel.

March 18, 1918, all the papers in the case forwarded to the United States attorney, New York City.

June 30, 1918, case pending. (C. 604.)

No. 336. Tug "Ariosa" and dumper "No. 23-D."—Henry DuBois's Sons Co., 17 State Street, New York City, owners of tug and dumper.

The tug *Ariosa* passed to sea on the morning of March 13, 1918, and was inspected while passing the Narrows bound out at 11.15 a. m., when her tow was found to consist of dumpers *22-D* and *23-D*, both having all pockets loaded with mud. The tow proceeded seaward, reaching the dumping ground about 2.40 p. m., and was again inspected while bound in at a point about 2 miles southeast by east of Scotland Lightship at 3.15 p. m., when *22-D* was found to be entirely empty, and the first forward and forward middle pockets of *23-D* were fully loaded. There appeared to be no means on board the scow by which the doors could be closed after once having been opened. This tow was again inspected while passing the Narrows bound in about 6.30 p. m. of that date, when both dumpers were found to be entirely empty. It therefore seems clear that the contents of the above designated pockets in dumper *23-D* had been illegally deposited in the waters of the harbor, between the lightship and the Narrows.

March 25, 1918, all the papers in the case forwarded to the United States attorney, New York City.

April 12, 1918, libel filed against the tug and scow.

June 13, 1918, final decree in favor of United States entered in the sum of $250, and costs, $22. Case closed. (C. 607.)

No. 337. Tug "Imperial" and dumper "B. I. No. 12."—Cahill Towing Line, 140 Broad Street, New York City, owners of tug; William T. Charlesworth, 840 West End Avenue, New York City, owner of dumper.

The tug *Imperial* passed to sea on the morning of March 12, 1917, and was inspected while passing the Narrows bound out at 10.35 a. m., of that date, when her tow was found to consist of dumper *B. I. No. 12*, having all pockets fully loaded with cellar dirt, ashes, and sweepings. The tow proceeded seaward, reaching the dumping ground about 2.20 p. m., at which point the dumper failed to clear. The tow returned to the harbor and was inspected while passing a point bound in about 2½ miles east southeast of Scotland Lightship at 3 p. m., when the forward middle pocket was found to be loaded. This tow was again inspected while passing the Narrows bound in at 6.50 p. m., when dumper *B. I. No. 12* was found to be entirely empty. It therefore seems clear that the contents of the forward middle pocket of this dumper had been illegally deposited in the waters of the harbor, between the Narrows and Scotland Light Vessel.

March 25, 1918, all the papers in the case forwarded to the United States attorney, New York City.

April 12, 1918, libel filed against the tug and scow.

June 30, 1918, case pending. (C. 605.)

No. 338. Tug "Princess," dumper "R. R. No. 20."—Cahill Towing Line, 140 Broad Street, New York City, owners of the tug; Robert Rogers, 82 Beaver Street, New York City, owner of the dumper.

The tug *Princess* passed to sea on March 12, 1917, and was inspected while passing the Narrows bound out at 10.50 a. m. of that date, when her tow was found to consist of dumper *R. R. No. 20*, fully loaded with cellar dirt. The tow proceeded seaward, and upon reaching the dumping ground dumper *R. R. No. 20* failed to clear. The tow returned to the harbor and was inspected while bound in at a point 2½ miles east southeast of Scotland Lightship at 4 p. m., when the second forward pocket of this dumper was found to be fully loaded. The tow was again inspected while bound in at the Narrows about 7.45 p. m. of that date, when dumper *R. R. No. 20* was found to have all pockets entirely empty. It therefore seems clear that the contents of one pocket of this dumper had been illegally deposited in the harbor, between Scotland Lightship and the Narrows.

March 25, 1918, all the papers in the case forwarded to the United States attorney, New York City.

April 5, 1918, libel filed against the tug and scow.

June 30, 1918, case pending. (C. 606.)

No. 339. Tug "William H. Taylor" and dumper "37–M."—Morris & Cumings Dredging Co., 17 State Street, New York City, owners of tug and dumper.

The tug *William H. Taylor* passed to sea on the afternoon of May 29, 1918, and was inspected while passing the fort bound out at 2.20 p. m. of that date, when her tow was found to consist of dumpers *37–M* and *51–M*, both dumpers fully loaded with mud. This tow was again inspected while passing Scotland Lightship bound out about 6 p. m., when dumper *37–M* was found to have the two middle pockets empty. It therefore seems clear that the material loaded into the above designated pockets of dumper *37–M* had been illegally deposited in the waters of the harbor at some point between the Narrows and Scotland Lightship.

June 11, 1918, all the papers in the case forwarded to United States attorney, New York City.

June 30, 1918, case pending. (C. 618.)

11. APPROPRIATIONS.

Dates and amounts of appropriations for prevention of deposits, harbor of New York.

June 29, 1888	$30,000	Apr. 28, 1904	$73,260
Mar. 2, 1889	94,070	Mar. 3, 1905	85,260
Aug. 30, 1890	33,000	June 30, 1906	80,260
Mar. 3, 1891	33,000	Mar. 4, 1907	90,260
Aug. 5, 1892	33,000	May 27, 1908	85,260
Mar. 10, 1893	31,000	Mar. 4, 1909	85,260
Apr. 24, 1893 (deficiency)	2,000	June 25, 1910	100,260
Aug. 18, 1894	76,000	Mar. 4, 1911	85,260
Mar. 2, 1895	96,000	Aug. 24, 1912	85,260
June 11, 1896	59,000	June 23, 1913	85,260
June 4, 1897	59,000	Oct. 22, 1913 (deficiency)	5,000
July 1, 1898	59,000	Aug. 1, 1914	94,260
Mar. 3, 1899	110,500	Mar. 3, 1915	85,260
June 6, 1900	76,100	July 1, 1916	160,260
Mar. 3, 1901	72,800	June 12, 1917	96,760
June 28, 1902	70,260	Mar. 28, 1918 (deficiency)	18,500
Mar. 3, 1903 (deficiency)	10,000	July 1, 1918	95,760
Mar. 3, 1903	120,260		

RECLAMATION AND DEVELOPMENT OF ANACOSTIA RIVER AND FLATS, FROM ANACOSTIA BRIDGE NORTHEAST TO THE DISTRICT LINE, D. C.

REPORT OF COL. W. L. FISK, UNITED STATES ARMY, RETIRED.

The U. S. hydraulic dredge *Dalecarlia*, after arrival in Washington, D. C., from the Rappahannock River, Va., was undergoing repairs from April 2 to May 1, when she was towed to the Anacostia River and began operations on May 6, 1918. The cost of overhauling the dredge was $1,628.56. During the period May 6 to June 27 the dredge was operating on a 12-hour per day basis for 45 days, making 411 $\frac{35}{60}$ pumping hours, and excavated 79,841 cubic yards of material at an average hourly rate of 194 cubic yards, and a unit cost of 5.29 cents. The excavated material, consisting of 100 per cent mud, was deposited through discharge pipes on the flats in section E and resulted in an average fill of about 1 foot. The cost of the work, including inspection and incidentals, was $2,955.01. Under authority May 23, 1918, E. D. 119462, the *Dalecarlia* was diverted to war work at Fort Washington, Md., and Fort Hunt, Va., and on June 28 was towed to the dredging grounds. The dredge was put in position on June 29–30, preparatory to commencing dredging at Fort Hunt, Va.

The three months trial run of the hydraulic dredge *Captain Andrew Talcott*, in progress at the end of the previous fiscal year, was completed on September 18, 1917, at which time the dredge was formally accepted by the Government for $60,000, and an expenditure of that amount was made. Dredging was continued to December 7, 1917, when operations were suspended on account of the ice. During the period July 1 to December 7, the dredge was operating on a 12-hour per day basis for 114 days, making 934$\frac{1}{6}$ pumping hours, and excavated 311,876 cubic yards of material at an average hourly rate of 334 cubic yards, and a unit cost of about 10 cents. The excavated material, consisting of 82 per cent mud, 14 per cent gravel, and 4 per cent sand, was deposited through discharge pipes on the flats in sections D and E and resulted in an average fill of about 4 feet in section D and 1½ feet in section E. The dredging covered the upper 40 per cent of the river area in section D and resulted in a depth of 18 feet at mean low water. The cost of the dredging work, including inspection and incidentals, was $23,784.59.

While this dredge was received in good condition as regards hull and machinery, very thorough overhauling and repair was required to place it in first-class operating condition. When brought to this district it had been laid up for 15 months and was deficient in equipment, as was understood when it was purchased under authority of E. D. 106,486. During the winter the dredge was thoroughly overhauled and repaired at a cost of $12,639.58. Under authority dated

March 18, 1918, E. D. 85760/93, the name was changed from *Captain Andrew Talcott* to *Talcott*. Under authority dated April 10, 1918, E. D. 118570, the *Talcott* was diverted to war work for the Navy Department at Upper Machodoc Creek, Va., and on May 24 proceeded to that point where dredging operations were in progress on June 30, 1918.

Trench and embankment work for sea-wall foundations was prosecuted by the U. S. derrick boat *Atlas*, from July 1 to August 31, 1917, and from November 20, 1917, to June 19, 1918. During these periods the *Atlas* was in operation 1,274¾ hours, excavated and banked 151,398 cubic yards of mud and sand on 35,961 linear feet of embankment, or an equivalent of about 3 miles of completed trench and embankment. The expediture for trench and embankment work was $5,671.16, making the unit cost 3¾ cents per cubic yard of material moved. In the Navigation Channel of section F, the trenching is 100 per cent completed and the embankment work is 50 per cent completed; in Lake Kingman of section F the trenching is 35 per cent completed and the embankment work is 25 per cent completed.

A small hired force was employed in building levees for retaining the dredged spoils from the U. S. dredges *Dalecarlia* and *Talcott*, and in molding concrete blocks. The necessary waste weirs were constructed and maintained, the reclaimed areas were drained, and 754 concrete blocks were molded. Extreme difficulty was experienced in securing and holding the necessary laboring force. The cost of levees, waste weirs, and blocks was $4,432.34.

The work of riprap sea-wall foundations was continued to December 1, 1917, under a contract and a public notice order with the Columbia Granite and Dredging Corporation; 13,804.5 cubic yards of riprap were delivered and placed. About 2,000 feet of foundation was built between the Pennsylvania Railroad bridge and the Benning Bridge and a small settlement was restored between Pennsylvania Avenue Bridge and Pennsylvania Railroad bridge. From July 10 to September 28, a total of 188.2 cubic yards of building stone at $2.25 per cubic yard, were delivered under existing contract with Columbia Granite and Dredging Corporation. A slide in the riprap foundations in section E immediately above Naylors Run sewer, was repaired by the U. S. derrick boat *Atlas* November 20–22. The contract for riprap and building stone with Columbia Granite and Dredging Corporation requiring completion on September 20, 1917, was extended on account of the scarcity of labor and supplies occasioned by war conditions. The contract price for riprap in place was $1.74 per cubic yard. The cost of the work including inspection, superintendence, and incidentals was $25,448.32.

The snag boat *York* was used to place the bottom courses of concrete blocks of the sea wall in section E from July 30 to December 8, when operations were suspended on account of the ice. The work resulted in the placing of 1,125.5 linear feet of concrete blocks. The expenditure on this work was $4,342.41. No finished sea wall was built this fiscal year on account of the difficulty in securing the necessary stone, the scarcity of labor, and the extremely high wages demanded.

The following floating plant was constructed:

One ponton, *No. 31*, by hired labor. The cost of materials, labor, and incidentals was $108.49.

One rowboat, *No. 7*, by hired labor. The cost of materials, labor, and incidentals was $99.59.

Two scows, *No. 9* and *No. 10*, were completed by hired labor. The cost of materials, labor, and incidentals was $4,103.05.

Negotiations were in progress for acquiring the land necessary for the project. In reply to proposal sent out, bids for various parcels of land in section F have been received. One condemnation case in section E is pending. The exchange of lands between the Pennsylvania Railroad Co. and the United States was authorized by Congress. Deeds have been prepared and executed by the railroad company and are now being examined by the Attorney General's office before final approval by the Secretary of War. No land was purchased and no expenditures were made therefor during the year except for office work.

During February and March surveys were made in section F resulting in the complete layout and triangulation control of Lake Kingman and original soundings on Navigation Channel. Surveys incidental to the purchase of land and the layout of the different works were also made throughout the year. The expenditures for surveys were $658.63.

The U. S. tug *Castle* was engaged from time to time in towing floating plant and coal, and carrying supplies. The expenditure for the operation and maintenance of the tug was $3,605.62.

Under a permit dated December 21, 1917, the Smoot Sand & Gravel Corporation between February 6 and 27, removed 2,179 cubic yards of gravel and 2,653 cubic yards of sand immediately below the Pennsylvania Avenue Bridge. This permit was issued to aid in war construction at the navy yard, while sand and gravel beds elsewhere were shut off by ice.

In addition to the above-mentioned sums the following expenditures were made: For the use, maintenance of, and repairs to other floating plant, and for the care of Government property, $7,100.84; for coal purchased for dredging operations, $2,354.01; for expenditures this year for pontons built during the previous fiscal year, $380.91; and for engineering, clerical, maintenance of office and miscellaneous expenses $12,777.26, making a total expenditure of $172,090.37 during the fiscal year.

It is estimated that the project is now 24 per cent completed.

The principal items of work are summarized as follows:

Items.	Work done.		
	Prior to fiscal year 1918.	During fiscal year 1918.	Total to June 30, 1918.
Excavation and deposit made on flats............cubic yards	1,931,201	391,717	2,322,918
Sea-wall foundations, riprap placed....................do....	130,267	13,805	144,072
Sea-wall foundation, grillage........................linear feet..	1,065	....	1,065
Embankment built..cubic yards..	288,191	151,398	439,589
Masonry sea wall..linear feet..	9,376	....	9,376
Piles driven...	1,632	....	1,632
Old piles drawn and removed from river.....................	757	....	757
Land purchased..	$77,555.37	....	$77,555.37
Construction or purchase of floating plant....................	$43,618.72	$64,311.13	$107,929.85
Total expenditure..	$581,783.81	$172,090.37	$753,874.18

CONTRACTS IN FORCE.

RIPRAP AND BUILDING STONE.

Contractor: Columbia Granite & Dredging Co., Washington, D. C.
Date of contract: June 6, 1916.
Date of approval: June 16, 1916.
Date fixed for commencement: July 21, 1916.
Rate required: Riprap, 4,000 cubic yards per month; building stone 400 cubic yards per month.
Amount of contract: Riprap, 50,000 cubic yards, 40 per cent ±; building stone, 4,000 cubic yards, 40 per cent ±.
Unit price: Riprap, $1.74 per cubic yard; building stone, $2.25 per cubic yard.
Completed at end of month: 92 per cent.

APPROPRIATIONS.

Mar. 2, 1911	$100,000
June 26, 1912	100,000
Mar. 4, 1913	100,000
July 21, 1914	100,000
Mar. 3, 1915	100,000
Sept. 1, 1916	200,000
Mar. 3, 1917	300,000
Aug. 31, 1918	75,000
Total	1,075,000

WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA.

REPORT OF COL. W. L. FISK, UNITED STATES ARMY, RETIRED.

Operations were carried on during the fiscal year under the following appropriations, approved March 3, 1917, and October 6, 1917.

1. Maintenance and operation of the Washington Aqueduct and its accessories.
2. Emergency fund.
3. Metering Government services.
4. Continuation of parking grounds of McMillan Park.
5. Ordinary repairs, etc., Conduit Road.
6. Lining tunnels.

1. MAINTENANCE AND OPERATION.

The work of maintenance includes the dam at Great Falls, about 2,800 feet in length; the conduit and tunnels, aggregating 16 miles in length; 3 sedimentation reservoirs, each about 42 acres in area; about 900 acres of land; 14 miles of road; 4 bridges; fences; 3 pumping stations; 43 gatehouses, dwellings, and other buildings; 1 coagulating plant; 29 one-acre filters; 1 filtered-water reservoir; 29 sand bins; 1 pumping station for pumping the entire water supply to the filters; telephone line; 3 motor trucks; and 63 water meters on Federal services.

The amount of money expended on the above works, including outstanding liabilities, was as follows:

Conduit, tunnels, and flume	$87.29
Reservoirs	780.79
Buildings and grounds	13,078.77
Roads	1,022.38
Bridges	19.06
Fences	696.91
Pumping stations and machinery	55,227.59
Preliminary treatment	19,717.00
Filter operations	$18,120.04
Telephone line	32.60
Sewer	230.96
Watching and guarding property	63,875.19
Maintenance of meters	298.11
Motor vehicles	3,976.43
Overhead	16,836.88
Total	194,000.00

The nature of the above work was such that it is impracticable to give unit costs which would be comparable with those in other districts, and they have therefore been omitted.

The purification plant was continuously in operation throughout the year, and the results, amount of work, and cost, including the same for previous years, for comparison, are summarized in the following tables:

TABLE 1.—*Consumption (in million gallons) of water per 24 hours.*

(A) MAXIMUM.

Month.	Fiscal years.							
	1911	1912	1913	1914	1915	1916	1917	1918
July	78.32	75.78	74.42	73.68	72.86	62.11	65.47	66.41
August	74.25	73.64	72.08	69.95	66.78	62.34	64.04	71.76
September	70.33	65.75	71.66	70.48	65.72	59.61	66.10	66.58
October	70.52	66.47	66.14	63.44	68.10	62.00	59.68	67.42
November	63.62	67.73	57.02	60.96	57.11	56.39	58.39	64.00
December	70.76	62.16	58.99	56.58	67.86	56.11	59.03	63.97
January	68.20	92.72	59.19	62.31	56.91	57.80	61.56	75.87
February	64.21	80.20	57.84	67.75	55.52	57.74	68.82	80.59
March	58.83	76.71	58.19	70.93	53.67	58.04	58.85	70.91
April	67.63	68.39	63.83	59.81	58.33	55.70	56.37	69.12
May	74.82	71.55	64.44	63.54	63.37	60.67	60.59	75.09
June	74.41	69.88	68.34	69.59	65.38	58.14	68.26	78.44

(B) MINIMUM.

Month.	1911	1912	1913	1914	1915	1916	1917	1918
July	56.67	53.70	54.83	56.78	50.49	48.49	47.66	47.18
August	54.79	56.25	57.31	53.72	52.28	47.10	50.05	51.17
September	54.82	51.46	55.53	52.65	50.99	43.51	48.17	50.64
October	54.44	52.21	54.24	44.76	51.74	46.66	44.34	52.61
November	49.52	51.59	49.18	47.44	44.78	44.24	41.98	50.05
December	53.03	48.60	48.55	45.08	46.98	87.95	43.19	47.18
January	55.17	49.39	45.40	45.94	45.51	38.62	41.50	64.60
February	52.22	55.50	48.99	45.77	44.77	41.13	44.94	58.56
March	49.57	49.88	46.90	48.39	42.37	42.78	39.06	53.50
April	50.37	50.86	49.75	47.38	45.88	43.84	42.49	53.01
May	54.83	56.06	51.22	50.82	46.23	44.23	44.05	59.83
June	55.31	55.20	52.11	51.48	48.03	44.50	45.10	54.92

(C) AVERAGE.

Month.	1911	1912	1913	1914	1915	1916	1917	1918
July	64.22	66.17	64.94	63.64	58.83	55.93	56.76	58.58
August	62.82	63.82	64.78	60.15	59.53	55.46	57.88	62.37
September	62.59	60.64	63.01	59.33	58.49	55.04	57.07	60.60
October	61.05	59.23	58.67	55.60	58.31	54.48	51.59	58.50
November	57.91	56.25	54.51	53.02	52.84	49.78	50.95	55.41
December	62.77	53.59	53.64	50.42	54.43	48.41	50.74	58.15
January	60.67	71.65	51.57	53.17	52.10	49.31	51.92	70.88
February	57.18	70.98	52.39	56.60	50.28	49.46	54.25	68.21
March	53.99	60.32	52.59	56.78	48.71	49.49	49.89	62.04
April	55.76	57.91	55.14	51.13	51.20	50.14	50.49	62.38
May	63.04	61.25	57.82	57.10	53.88	52.67	53.69	67.51
June	62.18	61.63	60.24	60.40	55.53	52.61	60.08	67.75
Average	60.35	61.95	57.44	56.43	54.54	51.91	53.81	62.67
Population	348,460	354,019	352,936	353,297	353,664	357,749	359,997	395,947
Daily per capita consumption, gallons	173	175	162	160	154	145	149	158

TABLE 2.—*Consumption of water in Government buildings.*

Location.	Average daily consumption in gallons for the fiscal year—				
	1914	1915	1916	1917	1918
Municipal building	74,900	67,700	83,800	54,100	54,600
Government Printing Office	1,750,800	3,382,000	2,585,000	2,927,400	2,572,100
Navy yard	733,600	1,874,000	1,860,000	[1] 1,093,000	2,316,800
Soldiers' Home	334,000	423,000	379,000	306,300	231,900
Walter Reed Hospital	37,100	50,000	33,500	30,600	115,500
Marine Barracks	59,500	95,300	78,400	70,500	95,200
Zoological Park	217,900	294,000	314,000	399,800	457,700
Howard University	26,700	28,200	26,800	25,800	27,700
Freedmen's Hospital	46,900	59,400	61,000	62,900	71,900
Washington Aqueduct	....	27,900	84,900	99,800	136,700
Naval Hospital and Medical School	....	99,500	66,400	70,900	69,800
Hygienic Laboratory	....	15,400	18,700	22,200	14,400
Library of Congress	....	112,000	149,000	143,000	155,400
National Museum	....	57,200	46,800	35,700	26,200
Bureau Engraving and Printing	....	....	826,000	1,041,000	1,246,500
Agricultural Department	....	....	468,000	600,100	499,000

---

[1] Probably too small, as meter was too large to measure night flow.

TABLE 3.—*Turbidity.*

(A) MAXIMUM.

Fiscal year.	Great Falls.	Dalecarlia Reservoir outlet.	Georgetown Reservoir outlet.	McMillan Park Reservoir outlet.	Filtered water reservoir.
1906-7	1,530	250	150	250	13
1907-8	3,000	340	250	160	20
1908-9	1,500	200	170	85	8
1909-10	2,100	200	215	120	9
1910-11	1,500	120	70	40	1
1911-12	3,000	700	70	40	4
1912-13	3,000	750	....	95	1+
1913-14	3,000	400	85	37	0+
1914-15	8,000	700	65	18	0+
1915-16	3,000	600	110	56	0.5
1916-17	4,000	800	80	28	1
1917-18	4,200	1,600	70	52	1.5
(B) MINIMUM.					
1906-7	9	7	8	6	0+
1907-8	7	7	8	6	0
1908-9	7	7	6	5	0
1909-10	7	7	7	2	0
1910-11	7	7	7	1	0
1911-12	7	7	7	3	0
1912-13	6	7	....	2	0
1913-14	7	7	3	1	0
1914-15	6	7	7	2	0
1915-16	7	7	7	2	0
1916-17	7	6	7	2	0
1917-18	5	4	5	2	0
(C) AVERAGE.					
1906-7	114	46	37	29	2
1907-8	117	53	45	31	2
1908-9	79	50	32	22	1
1909-10	86	30	29	18	1
1910-11	41	18	16	10	0
1911-12	208	59	23	13	0
1912-13	159	51	....	15	0
1913-14	150	37	19	11	0
1914-15	190	46	15	8	0
1915-16	238	50	24	10	0
1916-17	247	54	18	10	0
1917-18	291	73	20	10	0

TABLE 4.—*Suspended matter entering system, etc.*

Fiscal year.	Amount that would have entered the system if the gates had been left continuously open.	Hours gates were closed.	Amount shut out.	Amount deposited in Dalecarlia Reservoir.	Amount deposited in Georgetown Reservoir.	Amount deposited in McMillan Park Reservoir.	Amount entering filtration plant.	Total.
	Tons.		*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
1905-6	7,177	228.0	3,264	1,849	657	424	983	7,177
1906-7	8,457	451.0	3,571	2,631	411	364	1,432	8,409
1907-8	9,586	463.0	3,684	2,511	1,238	721	1,498	9,655
1908-9	6,092	669.0	1,899	1,198	1,348	833	814	6,092
1909-10	6,522	920.0	2,613	2,122	515	611	661	6,522
1910-11	3,102	986.5	1,403	713	282	358	346	3,102
1911-12	16,979	1,857.5	5,142	8,605	1,353	1,392	487	16,979
1912-13	12,873	1,455.75	3,772	6,277	(1)	2,305	521	12,873
1913-14	11,251	1,775.9	4,950	4,337	[2] 1,014	583	367	11,251
1914-15	14,697	1,999.0	3,165	9,229	1,557	279	767	14,697
1915-16	19,815	3,058.0	6,643	10,470	1,260	553	889	19,815
1916-17	22,338	1,083.0	9,276	10,414	1,730	368	550	22,338
1917-18	26,305	1,310.5	15,736	6,314	3,212	657	386	26,305

[1] Out of service.

[2] Put into service Aug. 21, 1913.

TABLE 5.—*Preliminary treatment.*

Fiscal year.	Total number days used.	Total amount of hydrated lime used.		Total amount of alum used.		Cost per million gallons filtered.				
		Tons.	Pounds.	Long tons.	Pounds.	Labor.	Alum.	Lime.	Supplies.	Total.
1911-12	110	....	....	534	1,079	$0.05	$0.48	....	....	$0.53
1912-13	79	....	....	328	438	.06	.33	....	$0.18	.57
1913-14	84	....	....	293	1,473	.07	.31	....	.01	.39
1914-15	107	64	1,611	430	975	.08	.47	$0.02	.03	.60
1915-16	109	53	1,109	431	1,215	.09	.56	.02	.02	.69
1916-17	102	....	....	341	1,242	.07	.53	....	....	.60
1917-18	98	....	....	445	1,363	.07	.79	....	....	.86

TABLE 6.—*Bacteria per cubic centimeter.*

(A) MAXIMUM.

Fiscal year.	Dalecarlia Reservoir.		Georgetown Reservoir outlet.	McMillan Park Reservoir outlet.	Filtered water reservoir.
	Inlet.	Outlet.			
1906-7	63,000	24,000	23,000	15,000	200
1907-8	80,000	65,000	52,000	19,000	900
1908-9	90,000	12,500	13,000	3,500	160
1909-10	170,000	175,000	180,000	180,000	2,800
1910-11	75,000	49,000	25,600	25,000	300
1911-12	124,000	119,000	20,500	10,100	400
1912-13	35,000	18,000	....	2,200	31
1913-14	45,000	18,000	4,700	2,800	50
1914-15	68,000	34,000	13,300	9,800	108
1915-16	230,000	165,000	18,000	8,400	150
1916-17	65,000	30,000	28,000	6,600	165
1917-18	160,000	40,000	3,200	9,500	262

(B) MINIMUM.

1906-7	70	50	30	36	4
1907-8	16	17	23	16	4
1908-9	38	65	25	9	2
1909-10	37	80	43	22	3
1910-11	25	34	33	19	3
1911-12	35	24	70	3	1
1912-13	20	15	....	4	1
1913-14	15	13	20	10	1
1914-15	60	15	20	12	1
1915-16	40	22	15	15	1
1916-17	12	19	16	19	1
1917-18	26	14	13	14	1

(C) AVERAGE.

1906-7	4,850	1,940	[illegible],680	635	31
1907-8	6,300	2,700	2,940	1,250	55
1908-9	3,130	1,950	950	390	21
1909-10	14,300	13,850	10,850	6,820	143
1910-11	4,820	3,370	2,080	1,390	38
1911-12	8,200	6,000	2,600	1,100	35
1912-13	1,190	670	....	136	6
1913-14	3,200	1,200	500	280	7
1914-15	4,750	2,690	900	525	12
1915-16	5,540	4,720	990	406	15
1916-17	4,760	2,600	770	387	13
1917-18	4,450	1,740	350	350	11

TABLE 7.—*Results of tests for bacillus coli.*

(A) TOTAL SAMPLES EXAMINED.

Fiscal year.	Great Falls or Dalecarlia Reservoir inlet.			Dalecarlia Reservoir outlet.			Georgetown Reservoir outlet.			McMillan Park Reservoir outlet (applied water).			Filtered water reservoir.		Tap water from various parts of the city.	
Cubic centimeters	10	1	0.1	10	1	0.1	10	1	0.1	10	1	0.1	10	1	10	1
1905-6	108	108	108	155	155	155	121	121	121	169	169	169	171	171	80	80
1906-7	156	156	156	130	130	130	131	131	131	292	292	292	292	292	523	523
1907-8	307	307	307	65	65	65	122	122	122	351	351	351	351	351	765	765
1908-9	296	296	296	40	40	40	106	106	106	365	365	365	365	365	782	782
1909-10	286	286	286	171	171	171	177	177	177	365	365	365	365	365	774	774
1910-11	292	292	292	305	305	305	305	305	305	364	364	364	365	365	766	766
1911-12	301	301	301	303	303	303	218	218	218	362	362	362	362	362	770	770
1912-13	271	271	271	304	304	304	.....	.....	.....	365	365	365	365	365	814	814
1913-14	302	302	302	302	302	302	259	259	259	365	365	365	365	365	843	843
1914-15	304	304	304	304	304	304	304	304	304	365	365	365	365	365	885	885
1915-16	305	305	305	305	305	305	305	305	305	366	366	366	366	366	886	886
1916-17	305	305	305	305	305	305	305	305	305	365	365	365	365	365	885	885
1917-18	301	301	301	301	301	301	305	305	305	365	365	365	365	365	885	885
(B) NUMBER POSITIVE.																
1905-6	38	21	10	62	36	8	32	18	2	41	14	3	4	3	1	0
1906-7	96	68	30	75	38	16	67	39	14	95	38	4	13	6	28	5
1907-8	137	96	40	21	8	2	42	27	5	78	33	5	10	1	24	7
1908-9	115	60	25	12	6	0	29	9	3	61	26	3	3	0	9	3
1909-10	130	77	29	77	41	15	67	35	11	86	38	4	12	3	17	0
1910-11	110	49	15	92	35	5	60	11	2	53	8	0	3	0	12	5
1911-12	165	131	61	149	104	43	71	46	11	84	38	11	8	3	29	7
1912-13	180	129	64	166	115	52	.....	.....	.....	138	78	33	31	3	52	17
1913-14	226	157	61	192	115	25	127	60	16	97	38	6	7	1	13	8
1914-15	195	122	48	151	90	24	85	32	4	47	13	2	4	0	18	3
1915-16	181	137	70	135	83	23	58	24	2	22	7	0	0	0	4	2
1916-17	209	160	88	184	110	35	94	33	1	48	12	0	0	0	0	0
1917-18	180	122	61	136	86	35	72	32	3	43	13	0	5	0	3	0
(C) PERCENTAGE POSITIVE.																
1905-6	35.2	19.4	9.3	40.0	23.2	5.2	26.4	14.9	1.7	24.3	8.3	1.8	2.3	1.8	1.3	0.0
1906-7	61.5	43.6	19.2	57.7	29.2	12.3	51.1	29.8	10.7	32.5	13.0	1.4	4.5	2.1	5.4	1.0
1907-8	44.6	31.3	13.0	32.3	12.3	13.1	34.4	22.1	4.1	22.2	9.4	1.4	2.8	.3	3.1	.9
1908-9	38.9	20.3	8.4	30.0	15.0	.0	27.4	8.5	2.8	16.7	7.1	.8	.8	.0	1.2	.4
1909-10	45.5	26.9	10.1	45.3	24.0	8.8	37.9	19.8	6.2	23.6	10.4	1.1	3.3	.8	2.2	.4
1910-11	37.6	16.8	5.1	30.2	11.5	1.6	19.7	3.6	.7	14.6	2.2	.0	.8	.0	1.6	.7
1911-12	54.8	43.5	20.3	49.2	34.3	14.2	32.6	21.1	5.0	23.2	10.5	3.0	2.2	.8	3.8	.9
1912-13	66.9	45.5	23.9	54.5	38.1	16.9	.....	.....	.....	37.8	21.4	9.1	8.5	.8	6.2	1.9
1913-14	74.9	51.9	20.2	63.5	38.1	8.3	49.4	23.1	6.2	26.5	10.4	1.6	1.9	.3	1.6	.9
1914-15	64.1	40.1	15.8	49.8	29.6	7.9	27.8	10.5	1.3	12.8	3.6	.6	1.1	.0	2.0	.3
1915-16	59.3	44.9	22.9	44.3	27.2	7.5	19.1	7.9	.6	6.0	1.9	.0	.0	.0	.5	.2
1916-17	68.5	52.5	28.9	60.3	36.1	11.5	30.8	10.8	.3	13.2	3.3	.0	.0	.0	.0	.0
1917-18	59.8	40.5	20.3	45.1	28.6	11.6	23.6	10.5	.9	11.8	3.7	.0	1.4	.0	.3	.0

(D) AVERAGE NUMBER PER 100 CUBIC CENTIMETERS.

1910-11	65.0	28.4	11.0	4.0	0.1	0.8
1911-12	215.1	145.7	55.5	37.6	1.0	1.1
1912-13	248.5	192.0	....	104.7	1.7	2.4
1913-14	235.4	110.9	69.9	34.0	1.1	1.1
1914-15	597.5	218.5	23.8	9.3	.1	.5
1915-16	575.4	184.3	13.0	2.3	.1	.3
1916-17	1,109.6	340.0	15.7	4.4	.0	.0
1917-18	1,352.7	276.0	20.8	4.4	.2	.0

TABLE 8.—*Summary of sanitary analyses of weekly samples.*

(A) MAXIMUM.

[Results in parts per million.]

	Turbidity.[1]	Ammonia.			Nitrogen as—		Hardness.	Alkalinity.	Chlorine.
		Free.	Albuminoid.	Total.	Nitrites.	Nitrates.			
Dalecarlia Reservoir inlet	3,000	0.158	0.800	0.806	0.016	1.3	133.1	114.0	6.1
Dalecarlia Reservoir outlet	1,600	.104	.250	.252	.020	1.0	121.1	114.0	6.3
Georgetown Reservoir outlet	95	.116	.196	.230	.024	1.5	115.0	106.0	6.2
McMillan Park Reservoir outlet	55	.040	.075	.115	.014	1.1	124.6	103.5	6.2
Filtered water	2	.026	.060	.086	.010	1.0	130.1	106.0	5.9

(D) MINIMUM.

[Results in parts per million.]

Dalecarlia Reservoir inlet	4	0	0.008	0.012	0.002	0	37.7	29.0	1.5
Dalecarlia Reservoir outlet	4	0	.014	.022	.002	0	40.3	28.5	2.0
Georgetown Reservoir outlet	5	0	.004	.024	.002	0	41.2	20.5	2.3
McMillan Park Reservoir outlet	2	0	.005	.008	.000	0	45.8	22.0	2.5
Filtered water	0	0	.002	.002	.000	0	44.3	24.5	2.6

(C) AVERAGE.

Dalecarlia Reservoir inlet	150	0.019	0.096	0.115	0.008	0.37	77.3	66.4	4.0
Dalecarlia Reservior outlet	75	.029	.064	.093	.008	0.37	78.3	66.8	4.0
Georgetown Reservoir outlet	20	.032	.049	.081	.007	0.44	76.6	64.9	4.0
McMillan Park Reservoir outlet	10	.008	.033	.041	.007	0.42	76.3	63.3	3.9
Filtered water	0	.003	.019	.022	.002	0.38	75.7	64.7	4.0

[1] Summary of daily samples.

TABLE 9.—*Number of deaths from typhoid fever in District of Columbia.*

(A) TOTAL NUMBER BY MONTHS.

Fiscal year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Total.
1896-97	8	15	25	25	18	16	13	4	4	4	6	9	147
1897-98	10	16	18	10	9	18	8	4	2	9	6	20	130
1898-99	24	22	22	28	21	16	10	4	7	6	3	6	169
1899-1900	9	38	30	28	27	26	17	6	8	10	5	12	216
1900-1901	20	41	29	25	28	17	7	8	8	2	4	10	193
1901-2	16	33	28	21	22	16	19	8	12	9	13	9	206
1902-3	21	39	25	32	19	20	9	5	9	6	6	3	194
1903-4	17	26	18	19	8	14	5	5	6	10	8	8	144
1904-5	16	22	25	14	11	9	11	1	5	7	1	3	125
1905-6[1]	15	30	23	26	14	6	6	4	5	4	10	9	152
1906-7	21	32	21	25	17	4	7	6	4	6	7	2	152
1907-8	10	18	17	19	11	7	4	1	1	8	8	3	107
1908-9	15	13	23	17	16	13	16	8	3	8	7	7	146
1909-10	12	12	17	12	12	2	3	4	7	5	5	4	95
1910-11	6	12	13	8	9	5	6	4	4	3	8	2	80
1911-12	5	11	7	5	8	11	8	1	1	4	2	2	65
1912-13	11	9	16	11	8	6	4	4	4	2	2	5	82
1913-14	7	9	2	11	2	4	3	4	2	1	1	4	50
1914-15	4	11	8	3	2	4	2	2	4	1	2	2	45
1915-16	4	7	3	6	9	1	3	1	2	3	2	6	47
1916-17	7	8	7	3	3	1	3	0	0	4	1	2	39
1917-18	2	10	12	8	4	2	4	2	1	1	0	8	54
Average	11.8	19.7	17.7	16.2	12.6	9.9	7.6	3.9	4.5	5.6	4.9	6.2	119.9

[1] Filtered water supplied since October, 1905.

TABLE 9.—*Number of deaths from typhoid fever in District of Columbia*—Con.

(B) DEATH RATE PER 100,000.

Fiscal year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Annual death rate.
1896-97	35	65	109	109	78	70	56	17	17	17	26	39	53
1897-98	43	69	78	43	39	78	34	17	8	38	25	85	46
1898-99	102	93	93	119	89	68	42	17	29	25	12	25	59
1899-1900	37	158	125	116	112	108	69	24	33	41	20	49	74
1900-1901	82	167	118	102	114	69	28	8	32	8	16	40	65
1901-2	64	132	112	84	88	64	75	31	47	35	51	35	68
1902-3	83	153	98	126	75	79	35	19	35	23	23	12	68
1903-4	66	100	69	73	31	54	19	19	23	38	30	30	46
1904-5	61	83	95	53	42	34	41	4	19	26	4	11	39
1905-6	56	111	85	97	52	22	22	15	18	15	36	33	47
1906-7	69	105	69	82	56	13	24	20	13	20	24	7	42
1907-8	35	64	60	67	39	25	14	4	4	28	28	11	32
1908-9	53	45	80	60	56	45	56	28	10	28	24	24	43
1909-10	42	42	60	42	42	7	11	14	24	17	17	14	28
1910-11	21	41	45	28	31	17	21	14	14	10	28	7	23
1911-12	17	37	24	17	27	37	27	3	3	14	7	7	18
1912-13	37	31	52	36	26	19	13	13	13	7	7	17	23
1913-14	24	30	7	36	7	14	10	14	7	3	3	14	14
1914-15	14	37	27	10	7	14	7	7	14	3	7	7	18
1915-16	13	23	10	20	30	3	10	3	7	10	7	20	13
1916-17	23	27	23	10	10	3	10	0	0	13	3	7	11
1917-18	7	33	40	26	13	7	12	6	3	3	0	24	14
Average	44.7	74.8	67.2	61.2	48.4	38.7	29.0	13.5	17.0	19.1	18.1	23.6	37.9

TABLE 10.—*Pumping station (daily results).*

(A)

Fiscal year.	Million gallons pumped—						Lift to filters.	Pressure per square inch at sand-washer pumps.	Tons of coal consumed per day.			Station duty per 100 pounds of coal consumed.		
	To filters.			To sand washers.										
	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.			Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
1905-6	80.59	57.18	66.07	2.062	0.069	0.747	21.71	107.4	14.8	6.4	8.9	79.6	48.2	62.8
1906-7	80.29	57.44	66.89	2.120	.023	.580	21.60	120.8	15.0	7.0	10.0	71.6	46.5	58.6
1907-8	80.38	54.35	64.91	.735	.017	.347	22.20	125.0	12.0	7.2	9.6	70.7	51.8	60.3
1908-9	78.93	47.83	61.47	.875	.060	.453	22.52	122.3	13.2	7.0	10.0	74.0	45.7	57.7
1909-10	78.50	48.12	59.19	1.140	.008	.373	21.45	113.3	13.4	7.4	9.8	67.8	44.8	54.0
1910-11	78.32	46.69	60.38	.808	.008	.340	21.46	120.0	13.4	7.6	9.9	64.6	42.9	54.5
1911-12	72.72	46.61	61.94	.726	.002	.339	23.56	120.0	15.5	8.6	11.1	61.8	42.5	54.0
1912-13	74.42	45.40	57.44	.829	.017	.348	22.61	120.0	15.3	7.7	10.6	62.3	40.8	51.3
1913-14	73.68	44.76	56.43	.646	.062	.324	22.37	120.0	[1]16.3	[1]9.0	[1]11.7	63.5	39.9	50.7
1914-15	72.86	42.37	54.54	.704	.015	.327	22.36	120.0	[1]14.6	[1]8.9	[1]11.0	61.4	41.2	50.8
1915-16	62.34	39.95	51.91	.492	.022	.269	23.13	115.0	[1]13.7	[1]8.4	11.1	58.8	38.8	48.9
1916-17	68.82	39.06	53.81	1.346	.008	.417	21.74	115.0	[1]16.5	[1]7.0	11.7	60.2	36.1	46.3
1917-18	80.59	47.18	62.67	.608	.035	.319	23.34	115.0	[1]22.2	[1]9.5	14.6	64.7	31.3	45.2

[1] Short tons.

(B)

Fiscal year.	Name of coal used.	Cost per ton.	Duty per 100 pounds of coal consumed.	Cost of coal per million foot-pounds of work performed.
1905-6	Georges Creek Big Vein	$3.34	62.8	$0.00238
1906-7	do	3.43	58.6	.00261
1907-8	do	3.75	60.3	.00278
1908-9	Orenda	3.47	57.7	.00268
1909-10	do	[1]3.15	54.0	.00255
1910-11	do	[1]3.19	54.5	.00262
1911-12	do	[1]3.09	54.0	.00256
1912-13	do	[1]3.24	51.3	.00282
1913-14	Jenner	[1]3.14	50.7	.00309
1914-15	do	[1]3.21	50.8	.00315
1915-16	do	[1]2.89	48.9	.00291
1916-17	Miscellaneous	7.59	46.3	.00822
1917-18	do	6.44	45.2	.00718

[1] Corrected for increase or decrease in ash and British thermal units by United States Geological Survey.

TABLE 10.—*Pumping station (daily results)*—Continued.

(C) COST PER MILLION GALLONS FILTERED.

Fiscal year.	Office.		Operating force.	Coal.	Incidentals and repairs.	Total.
	Filtration.	Main.				
1905-6	$0.05	$0.04	$0.44	$0.56	$0.02	$1.11
1906-7	.12	.02	.52	.51	.12	1.29
1907-8	.15	.04	.56	.58	.17	1.50
1908-9	.16	.06	.56	.50	.15	1.43
1909-10	.18	.06	.66	.49	.17	1.56
1910-11	.18	.02	.61	.52	.14	1.47
1911-12	.16	.04	.59	.47	.12	1.38
1912-13	.17	.07	.65	.61	.13	1.63
1913-14	.18	.09	.71	.68	.20	1.86
1914-15	.14	.04	.65	.63	.31	1.77
1915-16	.13	.04	.75	.60	.23	1.75
1916-17	.12	.03	.77	1.45	.18	2.55
1917-18	.17	.05	.66	1.57	.19	2.64

TABLE 11.—*Filter runs or periods of operation.*

(A) FOLLOWING BOTH RAKINGS AND SCRAPINGS.

Fiscal year.	Number of runs ending.	Duration in days.			Million gallons filtered.		
		Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
1905-6	72	195	38	91	497.45	116.66	241.30
1906-7	105	199	30	75	466.12	101.53	217.78
1907-8	219	138	9	46	477.19	20.11	121.46
1908-9	179	135	11	46	298.08	39.26	115.17
1909-10	142	129	21	70	307.57	45.22	154.96
1910-11	163	139	17	62	304.83	41.55	128.78
1911-12	188	102	12	49	267.17	24.76	114.39
1912-13	165	121	16	61	252.84	53.91	131.18
1913-14	123	150	35	76	346.78	64.66	156.71
1914-15	114	197	25	93	399.98	37.03	157.00
1915-16	118	156	24	71	273.62	32.13	140.55
1916-17	175	189	15	65	442.85	22.13	127.18
1917-18	175	109	15	62	313.55	30.02	138.24

(B) FOLLOWING RAKINGS.

Fiscal year.	Number of runs ending.	Duration in days. Maximum.	Minimum.	Average.	Million gallons filtered. Maximum.	Minimum.	Average.
1910-11	76	139	17	53	304.83	41.55	114.52
1911-12	79	78	14	44	169.16	24.76	101.05
1912-13	83	121	16	54	225.57	53.91	115.48
1913-14	64	133	35	73	308.04	64.66	148.42
1914-15	69	197	36	99	399.98	81.84	198.22
1915-16	73	108	24	63	273.26	32.13	125.45
1916-17	119	189	15	63	442.85	22.13	123.65
1917-18	122	107	17	56	313.55	30.02	125.35

(C) FOLLOWING SCRAPINGS.

Fiscal year.	Number of runs ending.	Duration in days. Maximum.	Minimum.	Average.	Million gallons filtered. Maximum.	Minimum.	Average.
1910-11	87	130	22	70	280.81	48.60	159.97
1911-12	109	102	12	52	267.17	32.69	124.07
1912-13	82	121	17	69	252.84	37.14	146.97
1913-14	59	150	40	83	346.78	82.65	169.96
1914-15	45	147	25	84	285.98	37.52	167.90
1915-16	45	156	31	85	273.62	63.55	165.05
1916-17	56	163	19	70	411.88	37.61	134.61
1917-18	43	109	15	74	268.18	45.86	166.92

TABLE 12.—*Depth, scraping, and resanding.*

Fiscal year.	Number of filters scraped.	Depth of scraping, in inches.			Number of filters resanded.	Depth of sand replaced, in inches.		
		Maximum.	Minimum.	Average.		Maximum.	Minimum.	Average.
1905-6	68.07	4.47	0.53	1.77	4	17.2	12.0	15.2
1906-7	97.76	4.00	.39	1.95	18	19.9	7.9	13.3
1907-8	126.67	4.10	.34	1.34	11	18.1	10.1	14.9
1908-9 [1]	137.8	4.32	.41	1.58	12	21.2	9.2	14.9
1909-10	87.2	3.90	.60	1.33	7	22.0	10.1	15.7
1910-11	91.0	3.26	.35	1.22	7	16.3	11.8	14.0
1911-12	104.4	2.36	.36	1.06	9	16.5	11.5	13.3
1912-13	84.6	2.80	.71	1.30	10	17.6	8.1	11.2
1913-14	62.0	4.50	1.32	1.48	6	12.7	8.0	9.9
1914-15	42.7	2.06	.75	1.25	4	12.5	8.8	9.9
1915-16	42.3	3.22	.92	1.43	6	12.0	9.1	11.1
1916-17	53.0	4.91	1.06	1.58	8	13.5	8.6	10.3
1917-18	45.0	3.19	1.34	1.84	7	16.5	8.7	11.5

[1] Four filters filled by hydraulic injector. During the following years all filters filled by injector.

TABLE 13.—*Rates of sand handling.*

Fiscal year.	Sand removed from filters.			Sand replaced in filters.		
	Ejector hours.	Cubic yards removed.	Average rate cubic yards per hour.	Ejector hours.	Cubic yards replaced.	Average rate cubic yards per hour.
1905-6	....	16,137	....	....	5,172	....
1906-7	4,108	25,689	6.2	....	34,781	....
1907-8	3,132	22,275	7.1	....	21,393	....
1908-9	2,734	24,683	9.1	....	[1] 23,487	12.3
1909-10	1,717	15,505	9.1	....	[1] 16,876	10.6
1910-11	1,355	14,941	10.0	674	13,218	19.6
1911-12	1,354	14,820	10.9	864	16,095	18.6
1912-13	1,229	14,264	11.6	847	15,027	17.7
1913-14	1,013	12,343	12.2	672	12,775	19.0
1914-15	605	7,203	11.9	322	5,314	16.5
1915-16	674	8,171	12.1	543	8,974	16.5
1916-17	1,007	11,307	11.2	744	11,063	14.9
1917-18	950	11,130	11.7	731	10,825	14.8

[1] Part of sand replaced by carts.

TABLE 14.—*Filter operations.*

Fiscal year.	Million gallons water pumped to—		Number of filters—		Cubic yards of sand—	
	Filters.	Sand washers.	Scraped.	Raked.	Removed and washed.	Replaced in filters.
1905-6 [1]	19,402.82	42.40	68.07	....	[2] 16,137	5,172
1906-7	24,417.73	138.70	97.76	9	[3] 25,689	34,781
1907-8	23,758.24	76.98	126.67	86	22,275	21,393
1908-9	22,435.16	119.16	137.80	36	24,683	23,487
1909-10	21,605.44	91.777	87.2	51	15,505	16,876
1910-11	22,039.95	79.920	91.0	71	14,941	13,218
1911-12	22,668.40	84.856	104.4	83	14,820	16,095
1912-13	20,978.19	81.313	84.65	79	14,264	15,027
1913-14	20,596.50	69.249	62.0	62	12,343	12,775
1914-15	19,908.89	39.541	42.7	72	7,203	5,314
1915-16	18,999.51	44.350	42.3	78	8,171	8,974
1916-17	19,639.85	68.449	53.0	122	11,307	11,063
1917-18	22,873.09	55.813	45.0	118	11,130	10,825

[1] First filter put in service Aug. 18; total water supply filtered after Oct. 6.
[2] 8,324 cubic yards washed.
[3] 33,502 cubic yards washed.

TABLE 15.—*Cost per million gallons for filter operations.*

(A) LABOR.

Fiscal year.	Office.		Laboratory.	Scraping.	Ejecting and washing.	Smoothing.	Resanding.	Raking.	Incidentals and repairs	Filter attendants.	Pumping wash water.	Total.
	Filtration.	Main.										
1905-6	$0.06	$0.05	$0.20	$0.06	$0.31	$0.06	$0.04	......	$0.02	$0.14	$0.01	$0.95
1906-7	.13	.02	.18	.07	.25	.02	.24	......	.24	.11	.05	1.31
1907-8	.18	.04	.20	.09	.17	.01	.13	$0.02	.41	.11	.03	1.39
1908-9	.17	.06	.20	.07	.18	.01	.14	.01	.35	.12	.05	1.36
1909-10	.23	.07	.19	.05	.11	.01	.09	.01	.23	.12	.04	1.15
1910-11	.22	.03	.18	.06	.09	.01	.03	.02	.07	.12	.04	.87
1911-12	.19	.05	.18	.06	.08	.01	.03	.02	.07	.12	.03	.84
1912-13	.19	.08	.15	.06	.07	.01	.04	.03	.11	.13	.04	.91
1913-14	.20.	.04	.19	.05	.07	.01	.03	.02	.20	.13	.03	.97
1914-15	.19	.04	.22	.03	.03	.00	.02	.02	.22	.14	.02	.90
1915-16	.20	.06	.19	.04	.04	.00	.03	.02	.07	.14	.02	.81
1916-17	.24	.06	.19	.05	.07	.00	.04	.04	.06	.14	.03	.92
1917-18	.25	.07	.20	.05	.05	.00	.04	.04	.06	.12	.04	.98

(B) MATERIALS.

Fiscal year.	Filtration.	Main.	Laboratory.	Scraping.	Ejecting and washing.	Smoothing.	Resanding.	Raking.	Incidentals and repairs	Filter attendants.	Pumping wash water.	Total.
1905-6	$0.01	......	$0.03	......	$0.02	......	......	......	......	......	$0.01	$0.07
1906-7	.01	......	.02	$0.01	.06	......	$0.01	......	$0.20	......	.04	.35
1907-8	.01	$0.01	.04	......	.04	......	......	......	.07	......	.02	.19
1908-9	.02	.02	.08	.01	.03	......	.01	......	.18	......	.04	.39
1909-10	.02	.02	.11	......	.02	......	......	......	.05	......	.03	.25
1910-11	.01	.01	.07	.01	.03	......	.01	......	.08	......	.03	.25
1911-12	.02	......	.15	......	.03	......	......	$0.01	.03	......	.03	.27
1912-13	.01	.01	.05	.01	.04	......	.03	.01	.11	......	.03	.30
1913-14	.01	......	.07	......	.03	......	.02	......	.10	......	.04	.27
1914-15	.03	.00	.06	......	.02	......	.01	......	.01	......	.02	.15
1915-16	.02	......	.04	......	.01	......	.01	......	.02	......	.02	.12
1916-17	.01	......	.07	......	.03	......	.03	......	.02	......	:05	.21
1917-18	.01	......	.07	......	.02	......	.01	......	.01	......	.08	.20

(C) LABOR AND MATERIALS.

Fiscal year.	Filtration.	Main.	Laboratory.	Scraping.	Ejecting and washing.	Smoothing.	Resanding.	Raking.	Incidentals and repairs	Filter attendants.	Pumping wash water.	Total.
1905-6	$0.07	$0.05	$0.23	$0.06	$0.33	$0.06	$0.04	......	$0.02	$0.14	$0.02	$1.02
1906-7	.14	.02	.20	.08	.31	.02	.25	......	.44	.11	.09	1.66
1907-8	.19	.05	.24	.09	.21	.01	.13	$0.02	.48	.11	.05	1.58
1908-9	.19	.08	.28	.08	.21	.01	.15	.01	.53	.12	.09	1.75
1909-10	.25	.09	.30	.05	.13	.01	.09	.01	.28	.12	.07	1.40
1910-11	.23	.04	.25	.07	.12	.01	.04	.02	.15	.12	.07	1.12
1911-12	.21	.05	.33	.06	.11	.01	.03	.03	.10	.12	.06	1.11
1912-13	.20	.09	.20	.07	.11	.01	.07	.04	.22	.13	.07	1.21
1913-14	.21	.04	.26	.05	.10	.01	.05	.02	.30	.13	.07	1.24
1914-15	.22	.04	.28	.02	.05	......	.03	.02	.23	.14	.04	1.08
1915-16	.22	.06	.23	.04	.05	......	.04	.02	.09	.14	.04	.93
1916-17	.25	.06	.26	.05	.10	......	.07	.04	.06	.14	.08	1.13
1917-18	.26	.07	.27	.05	.07	......	.05	.04	.07	.12	.12	1.12

TABLE 16.—*Summary of costs per million gallons.*

Operation of Washington Aqueduct	$0.57
Preliminary treatment	.86
Pumping	2.64
Filter operations	1.12
Buildings and grounds	.55
Guarding property	2.74
Extensions and betterments	
Total	8.48

2. EMERGENCY FUND.

Through an unavoidable accident, which occurred March 14, 1918, at the filtration plant, a generator set, the engine of which had been in bad order for a long while, was burned out. At that time the other large generator set, was broken down and the plant was without lights except for such of those in the buildings as could be supplied by a small 8½ kilowatt set. Steps were taken at once to secure proposals for a new set, and as a result an order was placed with the Skinner Engine Co. for furnishing and installing it.

3. METERING GOVERNMENT SERVICES.

The work done consisted of installing one 8-inch meter and four 4-inch meters, on the services supplying the State, War, and Navy Building and one 6-inch, one 2-inch, and one ¾-inch meter on the services to the Treasury Building. The work was completed in June, 1918.

The cost of the above work was as follows:

Meters	$1,635.50
Fittings and supplies	929.27
Labor	1,035.23
Total	3,600.00

4. CONTINUATION OF PARKING GROUNDS OF M'MILLAN PARK.

The work done this year consisted of building 2,079 linear feet of concrete curb and gutter along the sides of the road around McMillan Park Reservoir at a cost of $3,000.

5. ORDINARY REPAIRS, ETC., CONDUIT ROAD.

The work done under this heading consisted of ordinary repairs to the macadam road surface, grading, opening ditches, and other maintenance operations.

The amount expended, including outstanding liabilities, was $5,000.

6. CONTINUING THE LINING OF UNLINED SECTIONS OF THE AQUEDUCT TUNNELS.

All of the work of the year was done in tunnel No. 1, which is located near Great Falls, Md., and between manhole No. 1 and waste weir No. 1. The length is 1,437 feet, all of which was originally unlined.

This tunnel is higher at the waste weir than at its upper end, so that, in order to provide for draining both the tunnel and the gatehouse above it, there is being excavated below the invert of the new lining a trench about 3 feet deep, in which is placed a 15-inch drain.

The work was discontinued on account of the scarcity of labor for carrying it on and for guarding the various structures at the same time. The consumption of water has increased to such an extent that it is probable that it will be necessary to suspend the work until after a new conduit has been built.

The amount of work done this year and its cost are as follows:

15-inch drain, 50 linear feet, at $7.91 per linear foot	$395.23
Concrete lining, invert, 70 linear feet, at $9.57 per linear foot	670.25
Concrete lining, arch, 60 linear feet, at $22.68 per linear foot	1,360.69
Engineering and clerical work	244.02
Total	2,670.19

TABLE 17.—*Appropriations for the Washington Aqueduct, dates of approval of acts, and revertments to Treasury.*

Total appropriations to fiscal year ending June 30, 1917 (see Annual Report, 1917, p. 3693)		$9, 489, 231. 81
Received for sale of land, etc.		15, 651. 39
Interest on claim of Maloney & Gleason		4, 719. 68
		9, 509, 602. 88
Reverted to Treasury to 1915	$52, 082. 79	
Reverted to Treasury, fiscal year 1916	4, 183. 00	
Reverted to Treasury, fiscal year 1917	5, 000. 00	
Reverted to Treasury to June 30, 1917		61, 265. 79
Net amount expended to June 30, 1917		9, 448, 337. 09
Appropriated:		
March 3, 1917—		
Maintenance and operation	$130, 000. 00	
Ordinary repairs, etc., Conduit Road	5, 000. 00	
Lining tunnels	10, 000. 00	
Emergency fund	5, 000. 00	
Parking grounds	3, 000. 00	
Oct. 6, 1917, maintenance and operation, deficiency	64, 000. 00	
Total	217, 000. 00	
Unexpended balance, 1918	8, 414. 26	
Expended during fiscal year ending June 30, 1918		208, 585. 74
Amount expended, including outstanding liabilities to June 30, 1918		9, 656, 922. 83
For construction		7, 916, 737. 21
For maintenance and operation		1, 740, 185. 62
Paid by the United States		6, 558, 820. 83
Paid by the District of Columbia		2, 748, 516. 26
Paid by the water department, District of Columbia		349, 585. 74
Total appropriated (see Annual Report, 1917, p. 3695)		4, 495, 334. 16
Reverted to Treasury		164, 431. 95
Net amount expended		4, 330, 902. 21
For construction		3, 508, 961. 71
For maintenance and operation		821, 940. 50
Paid by the United States		2, 165, 451. 105
Paid by the District of Columbia		2, 165, 451. 105
Appropriations for investigations for additional supply:		
May 26, 1908, preliminary investigations		10, 000. 00
Mar. 2, 1911, investigating Patuxent River		3, 000. 00
June 26, 1912, Great Falls water power		20, 000. 00
Total appropriated		33, 000. 00
Reverted to Treasury		1. 00
Net amount expended		32, 999. 00
Paid by the United States		16, 499. 50
Paid by the District of Columbia		16, 499. 50

Appropriations for metering Government services:

May 18, 1910	$7,000.00
June 26, 1912	4,850.00
Mar. 4, 1913	4,700.00
July 21, 1914	4,300.00
Mar. 3, 1917	3,600.00
Total appropriations	24,450.00
Reverted to Treasury to June 30, 1918	1,553.54
Net amount expended	22,896.46
Paid by the United States	9,648.23
Paid by the District of Columbia	9,648.23
Paid by the water department, District of Columbia	3,600.00

IMPROVEMENT AND CARE OF PUBLIC BUILDINGS AND GROUNDS IN THE DISTRICT OF COLUMBIA—WASHINGTON MONUMENT—HIGHWAY BRIDGE, DISTRICT OF COLUMBIA—MONUMENTS AND MEMORIALS.

REPORT OF COL. C. S. RIDLEY, UNITED STATES ARMY.

CONTENTS.

Page.

A. Public buildings:

  1. Executive Mansion, care, repair, refurnishing, etc 3774
  2. Executive Office Building 3776
  3. Executive Mansion greenhouses 3776
  4. Executive Mansion Grounds 3777
  5. House where Abraham Lincoln died 3796
  6. Buildings occupied as offices by the War Department 3796
  7. State, War, and Navy Departments Building 3799
  8. Temporary office buildings, War and Navy Departments 3782

B. Public reservations in the District of Columbia:

  1. Reservations added to park system during the year 3777
  2. Reservations improved during year 3778
  3. Maintenance of improved parks 3778
  4. Northwest division 3779
  5. Southwest division 3782
  6. East division 3783
  7. Potomac Park division 3784
  8. Water and drain pipes and fountains 3787
  9. Lighting the public grounds 3787
  10. Walks, roads, curbing, and coping 3788
  11. Benches, compost grounds, fences, and lodges 3788
C. Occupation of public grounds by private parties 3788
D. Children's playgrounds 3788

E. Park watchmen:

  1. Table of arrests 3789
  2. Remarks 3790
F. Band concerts 3790
G. Preparing grounds for outdoor sports 3790
H. Tidal Basin bathing beach, West Potomac Park 3793
I. Connecting parkway between Potomac Park, the Zoological Park, and Rock Creek Park 3794

J. Washington Monument:

  1. General report 3794
  2. Table 3795
K. Statues and their pedestals 3795

L. Propagating gardens:

  1. List of stock propagated, purchased, and distributed 3796
  2. Storehouse and shops building 3796
M. Departmental telegraph line 3799
N. Highway Bridge across the Potomac River, D. C 3799
O. Grounds of Library of Congress 3799
P. Grounds of Capitol 3800
Q. Grounds of executive departments 3800
R. United States wharf property, Washington, D. C 3800
S. Monument and wharf at birthplace of Washington 3800
T. Memorial to Gen. Ulysses S. Grant 3801
U. Statue of Commodore John Barry 3801

	Page.
V. Memorial to Abraham Lincoln	3801
W. District of Columbia Armory Commission	3802
X. Commission of Fine Arts	3802
Y. Memorial to commemorate women of Civil War	3802
Z. Arlington Memorial Amphitheater and chapel	3803
Z1. Monument to Francis Scott Key and others	3804
Z2. Arlington Memorial Bridge	3804
Z3. Public Buildings Commission	3804
Z4. Abstract of contracts in force during year	3805

PHOTOGRAPHS.

1. Upper entrance Meridian Hill Park	3782
2. New lodge house, Montrose Park	3782
3. War and Navy office buildings, Seventh and B Streets NW	3782
4. Memorial to Abraham Lincoln	3802
5. Memorial to women of the Civil War	3802
6. Arlington Memorial Amphitheater	3802

DRAWINGS.

1. War and Navy office buildings, Seventh and B Streets NW.:	
(a) Plan of entire group	3782
(b) Elevation of Seventh Street facade	3782

1. EXECUTIVE MANSION, GROUNDS, AND GREENHOUSES.

Care of mansion.—The work required to maintain the house in good condition was carried on throughout the year. The hardwood floors in particular require much attention in the way of cleaning, waxing, etc., and this was done with regularity. The tile floors in the entrance vestibule and in the main corridor on the first floor were also cared for.

General repairs.—Repairs were made to the plastering in the house and on the east and west terraces. All loose tiling in the bathrooms was reset. Minor carpentry repairs were made, and the walls of the state dining room and private dining room were cleaned. A screened sleeping porch was constructed on the roof and two new cabinets were built in the room adjoining the oval room on ground floor to better display the collection of historical china of the Presidents.

Heating.—The system was maintained in efficient working condition.

Lighting and plumbing.—The system, including the electric bell lines, was kept in good order.

Elevator.—This was maintained in good running order.

Painting.—On the ground floor the walls, ceiling, and woodwork in the laundry, servant's room, and kitchen, were given two coats of paint. In the chinaroom new patches were given four coats, and the side walls and ceiling were given one coat of paint. In the billiard room all walls and ceiling were given three coats. All woodwork in the toilets was sand-papered and given two coats of paint, and the side walls and ceiling were given three coats. In the oval reception room, the usher's locker room and the lavatory and wash room adjoining the latter room, the walls, ceilings, and wood work were painted and the radiators in oval room scraped, cleaned, and painted with aluminum.

On the second floor in the library three bedrooms, three bathrooms, four dressing rooms, and three passages between these rooms, the walls, ceilings, and woodwork were cleaned, and painted with several coats of paint; the woodwork in one bedroom, one bathroom, and a passageway between, was cleaned and given several coats of paint. Some furniture in one of these rooms was also painted.

The tin roof, chimneys, air shafts, gutters, vents, flashings, doors, windows, and flag pole were painted.

All bay tree and evergreen boxes on the east and west terraces were sandpapered and painted with two coats. The bases of columns on front portico and the coping around the front of the mansion were given one coat of paint.

Furniture and furnishings.—All draperies were taken down from windows and doorways at the beginning of summer, dusted, and packed away. Floor rugs were taken up, cleaned, and stored. All these were replaced in the autumn. The following extraordinary refurnishing was done with extra funds provided by Congress for the purpose:

Nine portraits of the Presidents were cleaned and varnished and 12 portraits were relined and supplied with new stretchers where needed. The frames of these portraits and of four mirrors were toned down and brightened. The frames of 400 bentwood chairs which are used at musicales, and the frames of 2 sofas, 1 centerpiece, 4 armchairs, 8 side chairs, 2 stools, and 1 screen were regilded and the velour pads used on the bentwood chairs were dry cleaned, repaired, and supplied with new tying ribbons.

In the entrance vestibule, first floor, main corridor and usher's room on first floor, 12 divans were reupholstered and recovered and new draperies for four windows and four doors were hung. The ropes used at the doors of the parlors were covered with new velvet.

In the east room on first floor, new draperies were placed at the seven windows and the frames of 13 window divans were regilded and re-covered with new material.

In the green parlor on first floor, the walls were re-covered with velvet, new draperies of same materials placed at the windows and 1 sofa, 10 armchairs, 4 side chairs, and 2 pillows were re-covered with new tapestry and 6 chairs recaned.

In the blue parlor, 1 sofa, 4 arm chairs and 13 side chairs were refinished, reupholstered, and recaned where necessary, and together with 4 foot-stools and 3 pillows were re-covered with new material.

In the state dining room, new draperies were hung at the 5 windows, 2 chair cushions were re-covered and 50 dining chairs were refinished, reupholstered and re-covered.

In the corridor on ground floor 4 settees and 2 arm chairs were refinished, reupholstered, and re-covered with new silk rep.

In the oval room on ground floor 2 sofas, 4 armchairs, 8 side chairs, 2 stools and one center settee were re-covered with new silk damask and two pairs of new window curtains and one pair of door portieres were hung.

One chesterfield sofa and 2 chairs were purchased for the billiard room on ground floor.

In the reception room adjoining the oval room on the east, 1 sofa and 3 side chairs were reupholstered and re-covered with new material.

In the ushers locker room on ground floor 21 new steel lockers for clothing were installed.

In the library on second floor the frames of 1 stool, 2 davenports, 1 couch and 12 chairs were refinished and these, with 9 pillows were re-covered with new silk damask.

In one bedroom and sitting room adjoining, new window draperies were hung, 1 valance, 1 door curtain, a lounge, 2 armchairs and 1 ottoman were covered with new material and new covers furnished for table and stand.

A new canopy was furnished for the beds in one room, 7 chairs and 1 couch recovered and 2 new table pads furnished. In one bedroom, a sofa and 5 chairs were recovered and new rep curtains put up at the windows.

In another bedroom, new window draperies, new bed canopy and curtains were hung, and 5 chairs, 1 fire screen, and 2 pillows recovered. In the dressing room adjoining, 4 pillows, 1 couch, 1 window bench and 2 side chairs were recovered.

Six large floor rugs were purchased, for corridor, billiard room, room on east side of oval room, all on ground floor; the main corridor and the state dining room on first floor and the library on second floor.

New summer slip covers were purchased for the furniture in the following named rooms: On the ground floor, the oval room, room adjoining on the west, the billiard room and the corridor; on the first floor, the entrance vestibule, main corridor, east room, blue room, and red room; on the second floor, the north hall, east hall, library, 5 bedrooms, and 3 dressing rooms.

New canvas duck was placed on the awning frames at 38 windows, and on 20 frames on the south portico.

Social functions.—An official dinner was given in August and another in December. The necessary preparations devolving upon this office were made, namely, providing attendants for the cloakrooms and for calling carriages, waiters for the supper room, the floral decorations, moving and replacing furniture, and restoring the mansion to its usual condition after the close of the functions.

Executive Office Building.—The usual care was extended to this building. Minor repairs were made to doors, windows, woodwork, plumbing fixtures, heating apparatus, and electric fixtures. All window sills were given one coat of paint. Five doors were sandpapered and given one coat of paint and one coat of enamel. Eight radiators were coated with gold bronze. In the basement, the ceilings at entrance were given one coat of water-color paint; brick sidewalls were given one coat of paint and woodwork was given two coats of paint. Wooden partitions and doors were given one coat of shellac and two coats of paint. The roof of the building was scraped and painted one coat. Window and door screens and glass doors were placed and removed during the year.

Greenhouses, Executive Mansion.—These houses are located at the propagating gardens in the Monument Grounds. Necessary attention was given to the large collection of plants, which were maintained in good condition. Flowers were raised and regularly furnished for decorating the White House. The flues of boilers were cleaned, the boilers repaired, leaking pipe joints recalked, and pipe straightened.

Necessary carpentry repairs were made to the 16 greenhouses. Old plant benches were removed and new ones installed. All new work was painted. Three thousand one hundred and thirty-eight linear feet of 2, 3, and 4 inch heating pipe was run to replace that quantity of old pipe removed. Under proposal and acceptance, greenhouses Nos. 8, 9, 10, 11, 12, and 13 were given one coat of white paint in the interior and exterior. All broken glass in greenhouses was replaced, 19,000 bulbs were boxed for winter flowering, 57,940 plants were propagated.

Grounds of Executive Mansion.—Constant attention was given to these grounds. Lawns were mowed and raked in the growing season, and roads, sidewalks, pavements, gutters, and drain traps regularly cleaned. Eleven trees were given special surgical treatment, five trees were chained and two dead trees removed. In the fall the display fountain east of Mansion was planted with evergreen trees and shrubs for winter effect. These were removed in the spring. In the colonial gardens south of the Mansion summer flowering plants and water lilies were cared for and removed to greenhouses during winter and replaced with 4,000 pansies. All iris plants were removed from north fountain and replanted around the south fountain. Three hundred and twenty-five iris, 6 standard roses, 16,200 bulbs, and 50 evergreen shrubs were planted.

In the south grounds 14 old arc electric lights were replaced with incandescent lamps.

During the winter months the snow was removed from the walks after each storm. The macadam roadway in the north grounds was treated with "Glutrin" over an area of 3,000 square yards.

2. PARKS AND PUBLIC RESERVATIONS IN THE DISTRICT OF COLUMBIA.

During the year six park spaces were added to the system by the transfer to the Chief of Engineers by the Commissioners of the District of Columbia of the following parcels of ground, under authority granted by section 2, paragraph (b) of the act of Congress approved July 1, 1898.

Number given to reservation.	Location of reservation.	Area.	Date of acceptance by the Chief of Engineers.
		Square feet.	
	A strip of street parking 22 feet wide on the south (W Street) side of Meridian Hill Park, between Fifteenth and Sixteenth Streets NW., a length of 442.67 feet; this area is now a part of Meridian Hill Park	9,669.17	Sept. 17, 1917
	A strip of ground 44 feet wide on the north side of the Smithsonian Grounds, between Ninth and Twelfth Streets NW., by reason of a reduction in the width of the North B Street roadway; this strip is now a part of the Smithsonian Grounds	48,656.85	Nov. 16, 1917
89a	Massachusetts Avenue, Fourteenth and B Streets SE	1,531.18	Nov. 22, 1917
317a	Georgia and Iowa Avenues and Varnum Street NW	1,030	Do.
318a	Georgia Avenue, Ninth and Taylor Streets NW	993	Do.
	A strip of ground 3 feet wide back of the sidewalk on Fifteenth Street west along the east side of the grounds south of the Executive Mansion between Pennsylvania Avenue and B Street North: this ground is now a part of the grounds south of the Executive Mansion	4,197.87	Apr. 26, 1918

The transfer of the foregoing spaces added 66,078 square feet, or 1.52 acres, to the total park area.

The total park area was reduced by 4,805 square feet, or 11 acres, through the transfer by the Chief of Engineers to the commissioners of the following areas which were taken from the parks mentioned and given to the commissioners for street purposes under the authority contained in the act of July 1, 1898 referred to.

Park from which taken.	Location of reservation.	Areas taken.	Date of transfer.
		Square feet.	
309g	Sixteenth Street, Park Road, and Pine Street NW	3,204	Nov. 22, 1917
306c	Lanier Place, Calvert Street, and Adams Mill Road NW	1,052	Nov. 27, 1917
305	Columbia Road, Nineteenth Street, and Wyoming Avenue NW	549	Mar. 22, 1918

There are now 1,117 acres of public land under jurisdiction of this office, exclusive of the Tidal Basin, which contains 110 acres.

SUMMARY OF PARK IMPROVEMENTS.

The following is a brief summary of the principal improvements that have been carried out in the parks during the fiscal year. They are described in detail in the pages that follow.

Seven unimproved reservations (Nos. 149a, 306a, 306b, 306c, 306d, 309d, 309g) were improved, the first six being improved and the last named being partially improved. Additional improvements were also made to 19 reservations hitherto only partially improved as follows: Nos. 25, 27, 28, 29, 33, 34, 36, 54, 62, 64, 86, 110, 143a, 143b, 235, 270a, 306, 325, and Scott Circle. Additional improvements were made in Montrose Park. The retaining wall on the west side of Meridian Hill Park was completed down to the site of the proposed lower entrance and excavation for work on this entrance was commenced. Three large temporary war office buildings were erected in Henry Park by contract under the direction of this office. Additional improvements were made in East Potomac Park and West Potomac Park. Work was commenced and prosecuted during the year for the construction of the end wings with porches of a field house in East Potomac Park. This work is being done under contract. Much additional planting was done, the following having been set out: Deciduous trees, 806; evergreen trees, 627; deciduous shrubs, 21,551; evergreen shrubs, 1,049; perennial plants, 3,790; vines, 453; rosebushes, 500.

SUMMARY OF PARK MAINTENANCE.

The improved parks and park spaces were maintained in good condition during the year. The work consisted generally in repairing worn places in the oiled and tarred roads; sweeping paved roads and walks; repairing and raking gravel walks and keeping them free of weed growth; cleaning gutters and drain traps; mowing and raking lawns, edging their borders, sodding or seeding bare places; removing dead trees; pruning trees and shrubs; trimming hedges; planting and caring for flower beds; setting, repairing, and painting trespass fences; washing and staking park benches; repairing board walks; and relaying brick gutters. Deadwood was cut out from trees and the cavities thus formed were filled with cement. Trees and shrubs were sprayed to prevent defoliation by insects.

Stable manure was spread over lawn surfaces during the winter and raked in the spring.

The snow was promptly removed from the park walks and the sidewalks around them, and sand was spread over ice and frozen snow that could not be readily removed. An area of about 205,000 square yards of walks were cleaned after each snowstorm.

In the autumn some of the flower beds were planted with pansy plants and some with flowering bulbs for early spring blooms. These beds were then covered with a coating of well-rotted stable manure. In these plantings 25,000 pansies and 62,000 bulbs were used. In May and June the beds were planted with 617,427 bedding plants. The beds were protected in most cases by hooped irons placed around them.

The special efforts made by this office during recent years to renew the bare places and worn borders of the lawns by resodding and sowing grass seed have been continued during the year, greatly improving the appearance of the parks.

In addition to the general work referred to above, the following special work was done:

NORTHWEST DIVISION.

Franklin Park.—Four large evergreen trees previously growing on the terraces of the Executive Mansion were planted. One evergreen shrub was planted.

Lafayette Park.—All exterior woodwork in the lodge house was sandpapered, puttied, and given two coats of paint.

Montrose Park.—The new lodge house was completed. This house is supplied with toilet facilities for men and women and tool rooms for park workmen. A brick wall and 45 square yards of cement walk was constructed around the house. A sewer and cesspool were constructed to drain toilets in the buildings. A summer house which stood in the southeast corner of the park was moved to a new location; necessary repairs were made, including painting. A stone wall was constructed around this summer house. An evergreen hedge of hemlocks removed from the site of the new temporary war offices in West Potomac Park was planted along the entire R Street front of the park and inclosing the main circular entrance; 24 large evergreen trees, previously growing on the Executive Mansion terraces, were planted; 925 linear feet of trench for hedge and 108 square yards of shrubbery bed were excavated; 435 square yards of gravel walk and 165 linear feet of bluestone steps were constructed; 936 square yards of excavation was made 6 inches deep around the proposed display fountain. An area of 378 square yards was graded and grass seed sown; 135 evergreen shrubs. 400 deciduous shrubs, 184 deciduous trees, 200 rosebushes. and 330 hemlocks for evergreen hedge were planted in various sections of the park. (A photograph of the new lodge house accompanies this report.)

Meridian Hill Park.—Three contracts were entered into for improvement work to be done in this park in accordance with approved plans during the past fiscal year as follows:

(*a*) Contract of September 6, 1917, for the completion of the construction of a north entrance to the park from Sixteenth Street in accordance with the approved plan. The following work was completed in accordance with the terms:

The construction of a wall to retain the high ground on the north side of the entrance.

The construction of the open stairway leading from the street level to the upper level of the park.

The casting and setting of all cast cement work above the cornice line of the entrance.

(*b*) Contract of June 26, 1918, for the excavating and filling of approximately 9,500 cubic yards of earth and the excavating and removing from the park of approximately 4,500 cubic yards of earth.

This work was not started until after the close of the fiscal year.

(*c*) Contract of June 28, 1918, for the underpinning of the extreme southern end of the high retaining wall on Sixteenth Street. This work will involve the excavation of 150 cubic yards of earth, and the placing of 94 cubic yards of concrete and brick underpinning foundation under the existing wall.

No work had been done under this contract up to June 30, 1918.

In addition to the contract work mentioned above the following work was done in this park by day labor under the supervision of this office:

The rough excavation for the construction of the future main entrance to the park from Sixteenth Street was 90 per cent completed, the excavated material, 4,397 cubic yards in volume, being removed from the park and deposited on a dump at Sixteenth Street and Piney Branch Run. The portion of the park situated between the two retaining walls on Sixteenth Street was prepared for the planting of evergreens and deciduous trees and shrubs. This bed is 710 square yards in area, and was planted with 20 trees, 266 deciduous shrubs, 196 evergreen shrubs, 345 perennials, 160 climbing roses, and 435 vines; 250 linear feet of pipe was laid to supply water for sprinkling these beds and 600 cubic yards of clay bank near the north entrance to the park was excavated and removed. (A photograph of the upper entrance accompanies this report.)

Mount Vernon Park.—Sixty evergreen shrubs were planted.

Scott Circle.—One hundred and twenty-five square yards of sod was laid and eight deciduous shrubs were planted.

Reservation 25, Pennsylvania Avenue, Twenty-fourth and K Streets NW.—Fifty-five deciduous shrubs were planted.

Reservation 27, Pennsylvania Avenue, Twenty-second and K Streets NW.—Fifty-five deciduous shrubs were planted.

Reservation 28, Pennsylvania Avenue, Twenty-first and I Streets NW.—Twelve deciduous shrubs were planted.

Reservation 29, Pennsylvania Avenue, Twentieth and I Streets NW.—Twelve deciduous shrubs were planted. A display fountain was constructed under proposal and acceptance.

Reservation 33, Pennsylvania Avenue, Thirteenth and E Streets NW.—Site of statue of Gen. Pulaski; five large evergreen trees previously growing in the Executive Mansion Grounds were planted; 21 evergreen shrubs and 20 deciduous shrubs were planted; 200 perennials were removed and 150 evergreen shrubs were lifted and replanted.

Reservation 34, Pennsylvania Avenue, Ninth and C Streets NW.—This reservation was highly improved. It was inclosed with a

10-inch cement coping 425 feet in length. A cement footwalk covering an area of 230 square yards and 69 linear feet of cement steps were constructed; 50 deciduous shrubs and four old deciduous trees were removed; 900 privet hedge and 54 deciduous shrubs were planted; 345 square yards of sod was laid.

Reservation 36, Pennsylvania Avenue, Seventh and C Streets NW.—Site of statue of Gen. Hancock; 43 evergreen trees were placed around the statue.

Reservation 62, Massachusetts Avenue and N Street between Sixteenth and Seventeenth Streets NW.—Fifteen evergreen trees were planted around the statue of Daniel Webster and 20 evergreen trees were rearranged.

Reservation 64, Massachusetts Avenue and N Street between Fifteenth and Sixteenth Streets NW.—Fifty-five square yards of sod was laid, 100 square yards of gravel walk was constructed, and 250 deciduous shrubs were planted.

Reservation 65a Highland Terrace, Massachusetts Avenue between Fourteenth and Fifteenth Streets NW.—Two hundred and twenty-five deciduous shrubs were planted.

Reservation 110, Virginia Avenue, Seventeenth and B Streets NW.—Twenty deciduous shrubs were removed.

Reservation 143a, New Hampshire Avenue and Eighteenth and O Streets NW.—One hundred and seventy-five deciduous shrubs were planted, 72 square yards of flower bed was made, 128 linear feet of 4-inch cement coping was constructed, and 24 evergreen trees were removed to nursery.

Reservation 143b, New Hampshire Avenue and Eighteenth and Corcoran Streets NW.—One hundred and seventy-five deciduous shrubs were planted, 25 square yards of flower bed was made, 72 linear feet of 4-inch cement coping and 40 square yards of cement walk was constructed, and 36 evergreen trees were removed to nursery.

Reservation 149, Connecticut Avenue, Seventeenth and Q Streets NW.—Fifty linear feet of waterpipe was run.

Reservation 149a, Connecticut Avenue, Twentieth and R Streets NW.—One hundred and fifty deciduous shrubs were planted and 572 square yards of flagstone walk was laid.

Reservation 270a, Florida Avenue and Nineteenth and T Streets NW.—Two hundred and five linear feet of 6-inch cement coping was constructed, 90 square yards of sod was laid, and 400 deciduous shrubs and one deciduous tree was planted.

Reservation 306, Twentieth and Biltmore Streets NW.—One large deciduous tree was planted.

Reservations 306a, 306b, and 306c, Adams Mill Road and Calvert Street NW.—Four hundred and sixty-three cubic yards of clay was excavated for flower bed. and replaced with 229 cubic yards of soil and 31 cubic yards of leaf mold; 282 linear feet of 1-inch and 1¼-inch water pipe was run for use in watering beds; 23 square yards of cement walk was constructed; 30 square yards of sod was laid; and 2,450 deciduous shrubs were planted for a hedge.

Reservation 306d, Columbia Road and Euclid Street NW.—Eighty-five square yards of shrubbery bed was excavated; 90 square yards of sod was laid; 1.280 privet hedge and 35 evergreen shrubs were planted; 63 linear feet of cement steps, 32 linear feet of cheek block, 248 linear feet of 10-inch cement coping, and 115 square yards of cement walk was completed.

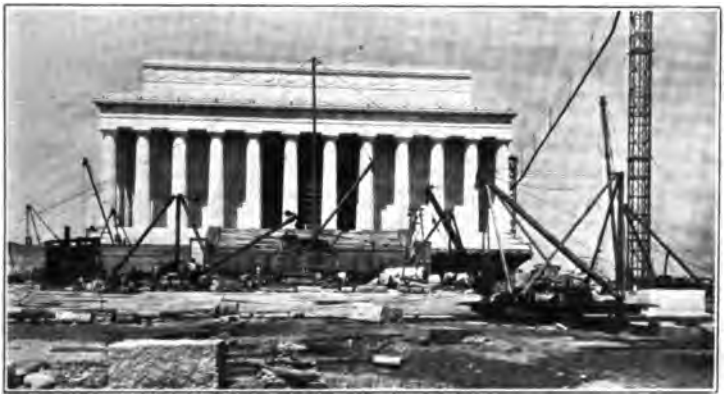
Reservation 309g Sixteenth Street and Park Road NW.—This reservation was highly improved. An area of 1,120 square yards of ground was graded, 476 cubic yards of clay being excavated and hauled away; 126 square yards of shrubbery bed was made, 120 square yards of clay being excavated and replaced with soil; 153 linear feet of waterpipe and 31 linear feet of 4 and 6 inch sewer pipe was run; 30 evergreen and 510 deciduous shrubs were planted and 6 stone benches were set. In accordance with the approved plan for the improvement of this reservation the following construction work was done under proposal and acceptance: One hundred and seventy-eight and nine-tenths square yards of brushed finish cement walk, 118.7 square yards of trowled finish cement walk, and 104.5 square yards of special scrubbed gravel finish concrete border was constructed. In addition to the walks, a small fountain 13 feet in diameter and 2 feet deep was constructed of concrete. The coping around the top of the fountain, 41 feet in length, was constructed of scrubbed gravel concrete to match the walk borders.

Reservation 325 (High-Service Reservoir Park), Wisconsin Avenue and R Street NW.—A contract was entered into for constructing new cement walks, coping, and steps and stone walls at this reservation. Under this 4 catch basins were constructed; 600 square yards of cement walk, 1,342 linear feet of cement coping, 1,630 linear feet of cement steps were constructed, 14 cubic yards of cement was placed in walls, and 50 perches of rubble stone work was completed; 415 linear feet of concrete wall and gutters and 25 linear feet of stone coping and caps were completed.

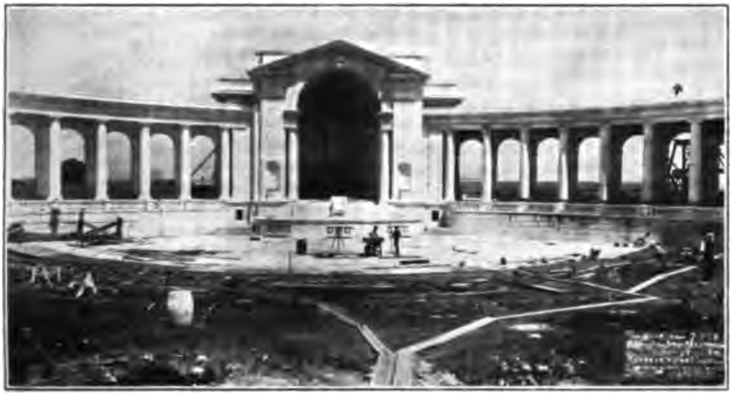
The following work was done by employees of this office: One hundred and forty-seven linear feet of 6-inch terra-cotta drain pipe and 26 linear feet of 4-inch cast-iron sewer pipe was run; 2,376 square yards of slope was graded and seeded, 190 square yards of sod laid, 102 square yards of shrubbery bed made, 1,218 deciduous shrubs, 110 perennials, and 300 rose bushes were planted; 4 large evergreen trees previously growing on the terrace of Executive Mansion were planted, 15 tree boxes were constructed and painted, 147 square yards of gravel walk was constructed, 155 linear feet of tile drain, 355 linear feet of 1¼-inch galvanized waterpipe were run, and 16 linear feet of 1¼-inch flagstone walk was laid.

SOUTHWEST DIVISION.

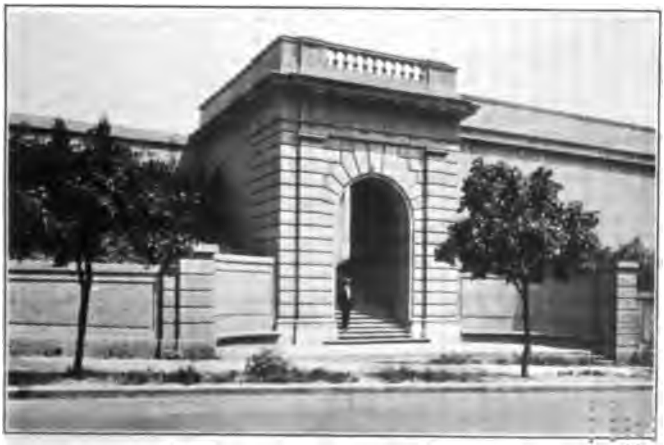
Henry Park.—In accordance with the authority of Congress contained in the urgent deficiency act approved October 6, 1917, which appropriated $2,000,000 for the purpose, three large temporary office buildings for the use of the War and Navy Departments were erected by this office in Henry Park. Each of these buildings consists of a head house 474 feet long and 44 feet wide, which runs east and west through the park, with six wings each 51 feet wide running north and south. In group A, which fronts on B Street north, these wings are 308 feet long; in group B they are 292 feet long, and in group C four are 356 feet long and two are 340 feet long. There were also constructed an administration building, a building for the mechanical force, and a restaurant building for the use of the



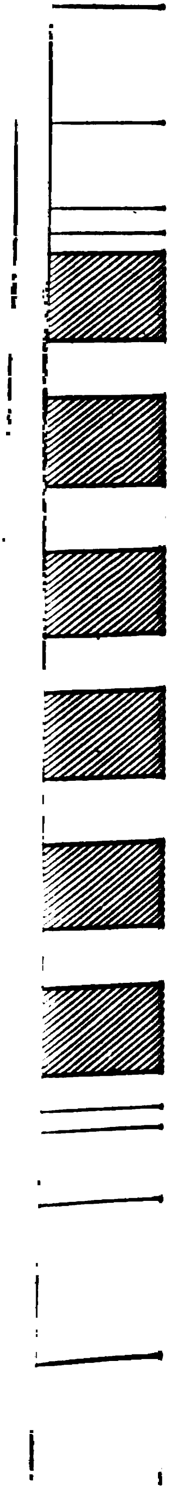
VIEW OF THE APPROACHES. LINCOLN MEMORIAL. VIEW LOOKING WEST.



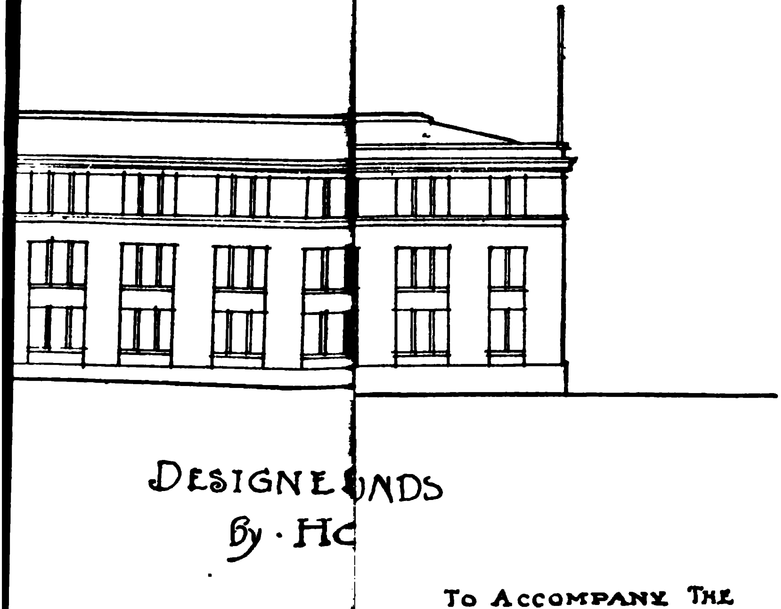
INTERIOR VIEW. ARLINGTON NATIONAL AMPHITHEATER. VIEW LOOKING TOWARD STAGE.



UPPER ENTRANCE TO MERIDIAN HILL PARK, FROM SIXTEENTH STREET NW. VIEW LOOKING SOUTHEAST.



F ENGINEERS



DESIGNE NDS

By · HC

RECOMM

TO ACCOMPANY THE
ANNUAL REPORT OF

Ridley

COL. USA., IN CHARGE.

JUNE 30, 1918

Government employees in the various offices. These office buildings are of wood construction with stucco on metal lath exterior throughout. They are fully supplied with fire protection equipment. (One photograph and two drawings of these buildings accompany this report.)

Seaton Park.—Five old diseased trees were removed. The urgent deficiency act approved March 28, 1918, provided for the erection of two temporary war office buildings for the use of the War Department in this part, one to be of wood and erected in the north side of the park between Four-and-one-half and Sixth Streets, and one of cement on the south side of the park between the same streets. These buildings were erected by the construction division of the War Department.

Smithsonian Grounds.—The narrowing of the roadway of north B Street between Ninth and Twelfth Streets NW. by the District Commissioners added a parking area of 1,113 feet long and 44 feet wide to the north side of these grounds; 21,875 square yards of surface was graded with soil along new side walk along B Street north of New Museum; 603 square yards of sod was laid; 120 linear feet of 6-inch terra-cotta sewer pipe was introduced.

A temporary wooden office building was erected at the northwest corner of this park fronting on Seventh Street and B Street north. The building is used for offices by the War Department. It is of wooden construction throughout with exterior stucco finish. It was erected by the construction division of the War Department under authority contained in the urgency deficiency act approved March 28, 1918.

Willow Tree Park.—A contract was entered into on June 29, 1918, for a new lodge house, supplied with toilet facilities for men and women, under a special appropriation of $3,500 provided for the purpose in Sundry Civil act approved June 12, 1917. Work under the contract is to be completed within 90 days of suitable working weather after the date of the contract.

Reservation 243, Potomac Avenue and R Streets, between First and Second Streets SW.—As the Commissioners of the District of Columbia were filling up and raising the grade of the streets around this reservation which left it much below the new level of the streets permission was granted them to also fill up this unimproved piece of ground to conform to the new grade.

EAST DIVISION.

Garfield Park.—The interior and exterior woodwork of the park lodge was given two coats of paint. Seven evergreen and 20 deciduous shrubs were planted; 180 perennial plants were removed.

Lincoln Park.—Seventy-nine evergreen shrubs were planted.

Maryland Avenue Center Parking.—Twenty-five deciduous shrubs were planted.

Pennsylvania Avenue Center Parking.—Operation for the planting of these center parkings were continued, trenches being opened in that portion between Fourth and Seventeenth Streets, and 15,340 deciduous shrubs planted to form a hedge along the parking; 300 deciduous shrubs were rearranged in beds, 455 square yards of shrubbery bed was excavated, 490 square yards of cement walk was constructed, 9,946 square yards of parking was graded, and grass seed sown.

Union Station Plaza.—The apparatus which operates the fountains here, consisting of a pump operated by an electric motor, was in such bad condition that a contract for furnishing and installing a new pump and motor was entered into on June 27, 1917, the work to be completed by September 27. Owing, however, to the necessity for the factory to execute more important orders for the Government the time limit of the contract had to be wavied. The apparatus has now, however, been completed and will be installed very soon. It was necessary to stop the running of the fountains in October, 1917, as the old apparatus was not in condition to be used.

Reservation 54, Pennsylvania and Potomac Avenues and Fourteenth Street SE.—Twenty-five deciduous shrubs were planted.

Reservation 84, Massachusetts Avenue, Seventh and B Streets NE.—One evergreen shrub was planted.

Reservation 86, Massachusetts Avenue, Ninth and A Streets NE.—Ten evergreen shrubs were planted.

Reservation 235, North Carolina Avenue and A, between Thirteenth and Fourteenth Streets NE.—Five evergreen shrubs were planted.

POTOMAC PARK DIVISION.

Maintenance of improved portion of West Potomac Park.—All regular maintenance work was carried on and, in addition, the following item of special work. The old water-bound macadam roadway along the Tidal Basin side of the Polo Field was reconstructed. A new wearing surface 2½ inches in thickness and 5733 square yards in area was constructed of crushed quartz and coal tar pitch. The roadway of north B Street from Seventeenth Street to Twenty-sixth Street was surface treated. A light coat of coal-tar pitch was well brushed into the surface of the road and then covered with a sprinkling of coarse sand. The area of roadway treated was 11,782 square yards. The portion of the park along the Potomac River from the Highway Bridge to the Lincoln Memorial was covered with flood waters caused by an ice jam in the river in February 1918. Large quantities of ice, silt, trees, and other débris were deposited on the slope in the park between the roadway and the sea wall. All of this refuse was removed and the grounds replaced in their former condition. The pressure of the ice against the seawall caused the top courses of masonry to be broken off and in several instances forced many yards upon the slope of the shore. Approximately 3,000 linear feet of the wall will require extensive repairs. About 100 linear feet of the wall was repaired this year.

In accordance with authority granted in the urgent deficiency act approved March 28, 1918, work was commenced by the Navy Department upon the two temporary office buildings which are to be constructed south of B Street between Seventeenth and Twenty-first Streets. Before work on the construction of these buildings could be started it was necessary to remove all planting material and tennis courts which formerly occupied this area. Six thousand and one hundred and sixty trees and shrubs were transplanted in an improvised nursery and in other parks. Those planted in the nursery will have to be again transplanted to a permanent location in the near future. Approximately 4,000 trees and shrubs which could not be transplanted, were cut down and burned. Three thousand and one hundred linear feet of iron tennis court backstop fence 10 feet high was removed from around 23 tennis courts which occupied the area now covered by the buildings.

Improvement of interior portion of West Potomac Park.—The filling in of the mound around the Lincoln Memorial progressed satisfactorily. More than 50,000 cubic yards of fill was received during the year free of all cost to the United States. The subgrading of the roadway of the northeast diagonal approach and of the large circular roadway around the Memorial was commenced. One thousand six hundred and forty cubic yards of cinder, old brick, and concrete was deposited along the line of the roadways to form a foundation for the paving. Three thousand square yards of roadway has been subgraded ready for compacting and placing of road metal. Grading was started for the lawn areas around the lower flight of steps on the main approach to the Memorial and between the northeast approach and Twenty-third Street on the north side of the Memorial. Four hundred and thirty-eight linear feet of 4 inch drain tile was laid to drain the ground water from around the lower flight of steps. A drainage ditch was constructed to carry the water to a sewer. Five thousand cubic yards of excavation was made in constructing this drainage ditch. Three thousand two hundred and thirty-six cubic yards of sandy earth was excavated and used to rough grade the portion of the terraces around and between the steps of this approach. Four thousand square yards of the lawn area on the north side of the Memorial was finished graded with good soil ready for seeding.

The old frame boathouse which stood on the shore of the Tidal Basin near the foot of Seventeenth Street was destroyed by fire. The foundation and all other débris remaining after the fire, was removed and the site graded, covered with top soil, and seeded. There was approximately 1,000 square yards of area improved.

On June 18, 1918, a proposal was accepted for constructing a new cement sidewalk 8 feet wide from the outlet gates of the Tidal Basin along the roadway to a point in front of the new bathing beach. This work was to be constructed along the line of the old bridle path, which required the removal of 1,425 square yards of cinder path and about 800 square yards of grading. Work was commenced in June and by the close of the month 421 square yards of the walk had been constructed leaving about 530 square yards to be constructed in July to complete the walk.

Under the special appropriation of $22,500 made for the purpose, work was continued by the District engineer officer in charge of the Potomac River improvement, for moving out the sea wall on the river side of West Potomac Park. The trench required for the proposed new wall was excavated for its entire length and 3,332.8 cubic yards of riprap stone for the foundation of the wall was placed therein. An order was placed May 27, 1918, under public notice and acceptance for 6,000 cubic yards of additional stone for continuing this foundation.

Care and improvement of East Potomac Park.—All regular park maintenance work was performed as usual and in addition the following special maintenance and improvement work was carried out. The perennial bed between the roadway and the sea wall on the Potomac River side of the park was given special care and mulching. Two thousand three hundred and seventy-five new perennial plants were set out in this bed during the year. The area between the roadway and the sea wall on the Washington Channel was filled in graded, and seeded. This area is about 900 feet long and varies from 30 to 100 feet in width. The earth required to fill this to grade amounted to 2,789 cubic yards. The entire area of 56,653 square yards was graded and seeded. A bridle path 10 feet wide and 8,000 feet long was graded out and 2,500 square yards of it was surfaced with cinders. The triangular area at the extreme southern point of the park was graded and seeded. The area improved is bounded by a temporary cinder roadway on two sides and by that paved road on the third side. It is approximately 3 acres in area. The construction of 9 golf greens was completed except for the seeding, which is to be done this fall. These greens are constructed in accordance with approved plans which provide for special drainage in the foundation, special quality of the soil which makes up the body of the mound, and special contouring of the finished surface. Special attention was given to secure the proper drainage. Seven hundred and forty-five linear feet of 4-inch drain tile was laid and 239 cubic yards of coarse cinders placed under the greens. One thousand five hundred linear feet of pipe was laid to supply water for sprinkling three of the greens. The surfaces of the greens were brought to the approved grades by the filling in of 4,385 cubic yards of sand and soil. The fairways of the first 9 courses of the golf course were cleared out through a thickly grown up wilderness of willow trees in the unimproved portion of the park. This clearing consisted of cutting down and stumping out of all trees, snags, and stumps in an area of 67 acres. About 30 acres of this area was then plowed and harrowed. By order of the Secretary of War, work was discontinued on the golf course in June, 1918, and the Boy Scouts were granted permission to utilize all of this area together with any other cleared portion on the park for agricultural purposes.

In accordance with the approved plans for the grading of approaches to the field house the filling in around the two wings of the house now being constructed was commenced. The amount of filling done during the year amounted to 14,637 cubic yards. This filling material was excavated from the bed of the canoe channel across the park just above the house. Two hundred and four linear feet of 12-inch sewer pipe was laid to prevent the accumulation of water in this excavation.

Field house in East Potomac Park.—The estimated cost of constructing this house was $200,000 and the sundry civil act for the fiscal year ending June 30, 1917, contained an appropriation of $50,000 for commencing construction, while the act for the fiscal year ending June 30, 1918, contained a similar amount for continuing the work. Under this a contract was entered into on June 19, 1917, for constructing "the end wings with porches and colonnades" of the structure. The work done during the fiscal year ending June 30, 1918, under this contract was as follows:

All excavation and reinforced concrete foundations were completed. The reinforced concreted basement walls and the main floors of both wings were constructed on both wings. The steel and wood framing for the roof of the women's wing is completed ready for sheathing. About 20 per cent of the ornamental cast concrete was set; 62 per cent of the heating and 53 per cent of the plumbing installation was completed.

Monument Grounds.—The Sylvan Theater was wired for the installation of electric lights. Five hundred and seventy-seven linear feet of conduit and wire were used in completing this work. The drainage of the ground around the theater was improved by the installation of three new catch basins.

WATER PIPES, DRAIN PIPES, AND FOUNTAINS.

Repairs were made to water pipes and valves where necessary and new valves put in. In the autumn the water was shut off from the various parks and the hose valves removed and taken to the shops at the nursery and repaired during the winter. In the spring the valves were replaced and the water turned on. During the year 2,098 feet of galvanized iron water pipe and 188 feet of lead pipe were laid.

Stoppages were removed from drain pipes and repairs made to broken pipes as required. Eight hundred and eighty-nine feet of terra-cotta drain tile was laid and 13 catch basins built.

The fountains were given regular attention and repairs made to supply pipes, waste pipes, and valves. The display fountains and their jets were cleaned weekly, except in winter, when the jets were removed and stored until spring. One sanitary drinking fountain was installed in West Potomac Park.

Repairs were made to the drinking fountains. The water was turned off from all the fountains during the winter.

LIGHTING THE PUBLIC GROUNDS.

The gas and electric lighting service in the public grounds was maintained in effective order by the lighting companies. Not many outages were reported, and whenever these occurred a proper deduction was made from the amounts due. One arc electric lamp in West Potomac Park was taken down and replaced by three incandescent lamps. Six arc lamps at the Propagating Gardens and three on the Fifteenth street driveway on the east side of the gardens were also replaced by the same number of incandescent lamps at a less yearly cost. Cable was run in the Monument Grounds and connected for the purpose of supplying current to the Sylvan Theater in these grounds. The 18 gas lamps in Henry Park were removed owing to the erection there of three large office buildings for offices for the War and Navy Departments. Electric current was introduced into three buildings at the Propagating Gardens. One of the gas lamps in Montrose Park was moved a short distance out of the way of some construction work. Eighteen gas-lamp posts in Seaton Park which were within the sites selected for two new office buildings to be erected there for offices for the War Department were taken down.

ROADS, WALKS, AND COPING.

Roads.—Bituminous bound macadam roads in West Potomac Park and the Presidents Park (White Lot) were resurfaced over an area of 41,214 square yards at an average cost of 3.1 cents per square yard.

Walks.—One thousand six hundred and twenty-three square yards of cement walk, 1,762 linear feet of concrete steps, and 402 square yards of gravel walk was constructed.

Coping.—Two thousand and forty-nine linear feet of cement coping was constructed around reservation.

OCCUPATION OF PUBLIC GROUND BY PRIVATE PARTIES.

On July 30, 1917, the Chief of Engineers extended to Mrs. Eugene Bettes, for a period of three years from that date, the permit granted to Mr. Eugene Bettes on July 24, 1914, to care for United States public reservation No. 282 at the intersection of Florida Avenue, Twelfth and K Streets NE., adjoining the property owned by her. This permit was granted under the general authority for such action contained in the act approved April 14, 1906. (34 Stats. pt. 1, pp. 112, 113).

On December 7, 1917, the Chief of Engineers renewed for a period of three years the revocable license granted Mr. W. O. Dungan on December 12, 1912, to use for gardening purposes United States reservation 244, located at the intersection of Potomac Avenue, One-half and R Streets, SW.

On May 1, 1918, the Chief of Engineers revoked the license issued May 8, 1916, to George A. Norris to use for gardening purposes United States reservation 243, at the intersection of Potomac Avenue, Second and R Streets SW. This was done at the request of Mr. Norris for the reason that the filling up of the surrounding streets by the District government left the reservation much below grade and rendered it undesirable for gardening purposes.

MISCELLANEOUS.

Benches.—Park benches were repaired, cleaned, and painted and loose benches were refastened.

Compost grounds.—These grounds are in the unimproved part of Potomac Park, east of the railroad embankment, far from any dwelling house. The manure was regularly hauled from the War Department stables and piled here.

Fences.—Repairs were made to iron post-and-chain fences and loose posts straightened and reset.

Park lodges.—The plumbing in the lodges was looked after and kept in good order and the toilets were regularly cleaned.

CHILDREN'S PLAYGROUNDS.

Under the authority contained in the act of Congress approved March 3, 1903, permission was granted to the department of playgrounds of the District government by letter of July 26, 1917, to use for playground purposes during the six months ending December 31, 1917, the west end of reservation 126, at Virginia Avenue and

Tenth Street SE.; the southwest corner of Garfield Park; the western end of reservation 19, at Fifth Street between K and L Streets SE.; and Willow Tree Park (reservation 201a), located in the interior of square 534, between Third and Four-and-a-half and B and C Streets SW. This permit was by letter of January 21, 1918, extended to June 30, 1918. By letter of April 24, 1918, the department of playgrounds was granted authority to also use the eastern end of reservation 19, thus giving them the entire use of this reservation.

PARK WATCHMEN.

The following table shows the character of police duty performed by the park watchmen during the past year:

Disposition of cases.

Nature of offense.	Number of arrests.	Fined.	Forfeited collateral.	Sent to workhouse.	Personal bonds taken.	Dismissed.	Probation.	Settled out of court.	Nolle-prossed.	Insane asylum.	Held for action of grand jury.	Escaped from police station.	Pending.	Total.
Drunkenness	298	115	88	67	18	3	1		5			1		298
Violation traffic regulation	303	22	245	1	28	4			3					303
Disorderly conduct	64	20	27	9	7	1								64
Violation park regulation	12	1	10		1									12
Violation police regulation	31	4	21	2	3	1								31
Colliding	27	5	11			3		5	3					27
Concealed weapons	4	1			2				1					4
Unlawful assembly	13	4	5		2	1	1							13
Vagrancy	20		2	12	2	3				1				20
Indecent exposure	11	4	2	2		2			1					11
Grand larceny	4					1					1		2	4
Robbery	2										1		1	2
Violation excise law	22	4	5	9	3		1							22
Insane	2									2				2
Assault	5	2			3									5
Attempt at larceny	3	1		2										3
Sodomy	1										1			1
Soliciting prostitution	1	1												1
Fugitive from parents	2				2									2
Petit larceny	2			1		1								2
Total	827	184	416	105	71	20	3	5	13	3	3	1	3	827

Record of fines.

Collateral forfeited	$3,039
Fines imposed	2,065
Total	5,104

Miscellaneous.

Sick or injured sent to hospitals	85
Sick sent to their homes	7
Children taken to parents for correction	32
Lost children to police stations	4
Attempt at suicide	1
Rescued from drowning	4
Drowned	3
Bodies sent to morgue	3

Efforts to secure sorely needed improvements in the United States park police have been made by representation to Congress and by recommendations in previous annual reports. Unfortunately these efforts have, in the main, been unsuccessful.

A pension fund similar to that now authorized for the Metropolitan police should be established for the park police. It is provided by act of Congress that money accruing from fines and forfeited collateral is appropriated to the Metropolitan police force as a pension fund. The fines resulting from the arrests made by the park police should be segregated and carried into a separate fund for temporary assistance for policemen who may be temporarily disabled on duty or who may be sick, administered in the same manner as the present Metropolitan police fund.

The duties of the United States park police are practically identical with those of the Metropolitan police, and yet the fines resulting from the work of the park police ($5,104 this year) are paid over to benefit another police force which had nothing whatever to do with the making of the arrests which resulted in the collection of this money, and which is a force with which the park police is not in any way connected. The continuance of this condition is most disheartening, and it is hoped that Congress may see fit to remedy it.

BAND CONCERTS.

These concerts were scheduled to be given by the United States Marine Band, the only band available, weather permitting, in the following-named parks from July 1 to September 30, 1917, and June, 1918:

Dupont Circle.—July 12, September 13, 1917.
Franklin Park.—July 19, August 30, 1917.
Garfield Park.—August 23, 1917, June 20, 1918.
Grant Circle (Petworth).—August 28, 1917, June 27, 1918.
Iowa Circle.—August 14, 1917, June 25, 1918.
Judiciary Park.—July 31, September 18, 1917.
Lincoln Park.—July 5, August 7, September 6, 1917, June 13, 1918.
Logan Park (Anacostia).—July 3, August 2, September 4, 1917.
McMillan Park.—July 10, August 9, September 11, 1917, June 18, 1918.
Montrose Park (Georgetown).—July 24, August 21, September 25, 1917, June 11, 1918.
Smithsonian Grounds.—July 17, August 16, September 20, 1917.
Washington Circle.—July 26, September 27, 1917.

In addition to the foregoing the following concerts were given, except when bad weather prevented:

West Potomac Park.—Wednesday and Saturday afternoons in May, 1918, from 5 to 6.30 p. m.

Grounds south of Executive Mansion (Ellipse).—Saturday afternoons from July 1 to September 30, 1917, and in June, 1918, from 5 to 6.30 p. m.

EXTENSION OF BUILDINGS BEYOND THE BUILDING LINE.

No permits for extensions of this character on private lands adjoining public reservations were referred by the War Department during the year for the action of this office.

PREPARING GROUNDS IN PARKS FOR OUTDOOR SPORTS.

The sundry civil act for the fiscal year ending June 30, 1918, appropriated $10,000 for "placing and maintaining special portions of the parks in condition for outdoor sports." Under this the following activities were conducted:

There are now in use 12 baseball diamonds, 14 tennis courts, 1 croquet court, 1 practice golf course, 1 hockey field, 1 polo field, 1 soccer ball field, 1 cricket field, 1 hurling field, 1 pole vault and high jump, and 1 broad jump. These facilities were maintained in good playing condition throughout their respective seasons during suitable weather. Base bags, pitcher's plates, and home plates were provided on the baseball diamonds. Foul lines and playing lines were marked and ropes to restrain spectators were placed where large numbers of persons gathered to witness the games. Tennis nets were provided for all the courts in use, which were kept in good condition and properly marked. The 15 courts in Henry Park were used until the early part of October and those in Potomac Park until the close of the season in November. The grass was cut to proper height on the baseball grounds, golf course, polo field, hockey field, etc.

Twenty-three tennis courts in Potomac Park and 15 courts in Henry Park at Sixth and B Streets N. W., all of which were highly developed and in excellent condition, were covered over by the erection of temporary buildings for the use of the War and Navy Departments. This resulted in leaving only 4 courts available in the public grounds, 1 in Garfield Park and 3 in Montrose Park.

In order partially to make provision for the great numbers of players who had been using the courts in Potomac and Henry Parks, 10 temporary courts were constructed in the early spring of 1918, in the old polo field on the southern side of the Tidal Basin. These courts were constructed by excavating the top soil of the ground for a depth of 6 inches to a level surface. There was then applied over the whole area a bed of cinders 4 inches thick to furnish drainage for the courts and to protect them against the destructive effects of frost. No subdrainage was installed, as no funds were available to cover that portion of the work, which is quite expensive. On the top of the cinders, when they had been thoroughly rolled and brought to an even grade, there was placed a top surface of clay which was thoroughly freed of stones and lumps and worked into a homogeneous mass 4 inches thick, forming a level smooth playing surface. The clay and most of the cinders were delivered at the site of the work without cost to the Government. Upon the completion of the work the grade of the courts is about 2 inches above that of the surrounding park, which insures a more rapid drainage and easier maintenance. Backstops were erected so as to inclose the entire 10 courts. These are 10 feet in height and constructed entirely of material salvaged from the courts which were lost in the building operations referred to above. They are composed of poultry wire stretched on 2-inch iron-pipe frames, the uprights of which are set in concrete bases 1 foot square extending 3 feet into the ground. Gates constructed of the same materials are placed at convenient intervals and are kept securely locked when the courts are not in use.

The popularity of the facilities for out-of-door recreation in the public grounds is attested by the great number of persons who use them. During the month of June permits for athletic games were issued as follows: Tennis, Potomac Park 381, Montrose Park 88, Garfield Park 17; baseball 129. Golf permits were issued during the spring season for the period ending June 30. A large number of players availed themselves of the opportunity thus afforded for this form of exercise. Permits for other sports were issued during the several seasons of the year as desired.

The number of tennis players using the courts was necessarily much restricted during the spring of 1918, because of the curtailment of the number of courts and their rather unfamiliar location. When the 38 courts in use heretofore were demolished, the only practicable space for erecting a small number of courts quickly to replace them with the funds available to the office was on the southern side of the Tidal Basin, as mentioned above. These temporary courts were completed as rapidly as the conditions surrounding the work would permit, and information concerning their completion and location were given general publicity. It has been found that, notwithstanding the distance of the courts from the homes and places of employment of the devotees of the game, and the fact that many players seem not to have learned of the existence of these courts, the application for permits to use them are fully as numerous in proportion as they were for the old courts which were always so greatly in demand and a source of pleasure to so many persons. About 40,000 players used the courts during the year.

The demand for baseball grounds during the spring and summer of 1918 was overwhelming. There were issued in June 129 permits for this game, as compared to 33 permits issued in June, 1917. This condition necessitated the division into two playing periods of the time between 4.30 o'clock p. m. and dark each day. Even then it was not possible to allot any club more than one period per week, except in the cases of leagues composed of several teams each and having regular schedules of games. The diamonds on the Ellipse in the President's Park were reserved for use by teams playing in uniform. Two of these diamonds were occupied, respectively, by the Navy League and the Departmental League. The diamonds in the Washington Monument Grounds and Potomac Park were assigned to teams composed of players from all walks of life. These included Government employees, schoolboys, business men, soldiers, sailors, marines, athletic associations, and miscellaneous groups. About 16,000 players used the diamonds during the year, and there were about 177,000 spectators of the games.

A change was made in the early spring in the method of issuing golf permits, so as to make them cover longer periods. A large number of persons were given permits for the use of the practice course, and it has furnished much pleasant recreation, though limited by physical restrictions to three holes.

The work of erecting the new bathhouse and beach on the southern side of the Tidal Basin, as authorized by Congress, was begun in the spring and probably will be completed about the 1st of August. They will be opened for use as soon as practicable, and will doubtless relieve a long-felt want for public bathing facilities in this city.

Large numbers of permits were issued during the year for military drill in various portions of the public grounds. These provided for detachments of officers of the Army and the Navy and of the Reserve Corps; soldiers and marines; groups of civilians, both men and women; organizations preparing for parades and other public demonstrations; and companies formed among the employees of Government offices as a means of exercise and recreation.

An athletic meet by the pupils of the Washington public schools was held from May 27 to June 7, in the grounds adjacent to the municipal bathing pools in the Monument Grounds, under permit granted by this office for that purpose. Permits were also issued for children's festivals in portions of the parks from time to time during the year.

The continuous effort of the office has been to render a service which would be of the greatest benefit to the public with the least practicable restriction upon the use of the facilities furnished for the several forms of recreation as authorized by Congress. The appropriations which have been made from year to year have not been sufficient to provide adequate means of meeting the demand made upon it, but no pains have been spared in utilizing to the best advantage the resources at hand. The success of the effort is demonstrated by many expressions of appreciation by those who have used these privileges and by the high character of sportsmanship which has been evinced in the enjoyment of the parks for these purposes.

TIDAL BASIN BATHING BEACH, WEST POTOMAC PARK.

The sundry civil act approved June 12, 1917, authorized and directed the Chief of Engineers to establish and maintain at a suitable place upon the shore of the Tidal Basin in Potomac Park a public bathhouse with necessary equipment and a sloping sandy beach, and appropriated the sum of $35,000 for the purpose.

In accordance with the plans prepared for this improvement, which were approved by the Fine Arts Commission, the following work was carried out:

A liquid chlorine purification plant was contracted for and installed under the inlet bridge, where all of the water which enters the Tidal Basin from the Potomac River will be purified. A sloping beach was constructed by the filling in of over 20,000 cubic yards of excavated material from the site of the temporary office buildings in Henry Park. The beach is 400 feet long and 100 feet wide to the point where the water is 3 feet deep. The rough filled material was carefully graded and a layer of clean sand will be spread over the entire area. A contract was entered into on May 13, 1918, for the construction of the central portions of the bathhouse and about half of the two wings which contain the dressing rooms and lockers. Work was started immediately and was more than 75 per cent completed on the 30th day of June, 1918. The building consists of a central portion 65 by 62 feet within which are located the toilet rooms, storerooms, service rooms, refreshment stand, and a large shelter in the form of a veranda, which overlooks the beach. On either side of the main building extend two wings within which are located shower baths, dressing rooms, and lockers. The building is constructed with terra-cotta walls, slag and composition roof, dressed Georgia-pine floors, and North Carolina framing.

The sundry civil act for the fiscal year ending June 30, 1918, contains an appropriation of $33,000 for completing this bathhouse, bathing beach, and purification plant.

3. CONNECTING PARK WAY BETWEEN POTOMAC PARK, THE ZOOLOGICAL PARK, AND ROCK CREEK PARK.

The sundry civil act approved June 12, 1917, appropriated the sum of $100,000 to enable the commission to continue proceedings toward the acquisition of lands required for this park way. The act also provided that the unexpended balance of the appropriation for the fiscal year 1917 should be available until expended. This balance amounted to $17,011.81, which made the sum of $117,011.81 available July 1, 1917. Of this amount $100,841.93 have been expended during the year in the purchase of 24 pieces of land. Surveys of the parkway have also continued during the year, the notes plotted and contours sketched. The claims of the United States to the land between Twenty-seventh Street and the shore of the Potomac River from Easbys Point to the foot of New Hampshire Avenue have been sustained by the courts and other suits are now pending. In October, 1917, the owners of the land in squares 2 and 3 over the route required for the park way relinquished this land to the United States without other compensation than the right to use the wharf and the bed of H street between squares 2 and 3 and between Twenty-seventh Street and Virginia Avenue as long as they may be needed by certain functions of their business.

4. WASHINGTON NATIONAL MONUMENT.

The usual care was taken to protect the shaft and keep it clean. The stairways, lands, railings, waiting rooms, marble walls on top floor and on landings, and the tablets in the interior walls were swept or otherwise cleaned. All machinery connected with the elevator was inspected, oiled, and cleaned each day before starting to carry passengers, and twice each week the safety appliances on the elevator car were tested, all by the employees at the Monument. In addition to this the elevator and all machinery connected with it were inspected once each month by an agent of a casualty company with whom a contract is in force for that service. The rooms in the power house and the lodge house were regularly cleaned and kept in good order.

The old plumbing in the two toilet rooms in the lodge house was replaced with new fixtures and the old cement floors and wood partitions were taken out and new terazzo floors with marble wainscoting and partitions installed. The down spouts on the building were repaired and new flashing placed around the vent pipes on the roof.

The State of Oklahoma and the State of Texas each presented a granite tablet which were inserted by this office in the interior walls of the Monument on the east side at the 290 foot landing, the first being placed on February 14, 1918.

The following table shows the number of visitors to the top of the Monument each month and the total during the year:

Months.	Number by elevator.	Number by stairway.	Total.
1917.			
July	19,223	2,263	21,486
August	24,082	4,035	28,117
September	22,093	5,686	27,779
October	17,288	4,752	22,040
November	14,581	3,935	18,516
December	13,242	5,309	18,551
1918.			
January	8,088	3,307	11,395
February	10,528	4,778	15,306
March	15,260	5,887	21,147
April	15,727	6,748	22,475
May	17,600	6,555	24,155
June	19,674	8,025	27,699
Total	197,386	61,280	258,666
Yearly averages, 1888–1898	103,901	50,958	155,859
Yearly average, 1898–1908	111,074	41,290	152,364
Yearly average, 1908–1918	158,723	29,914	188,637

The Monument is open free to the public every week day from 9 a. m. to 4.30 p. m., and on Sundays and holidays from 12.30 to 4.30 p. m.

During the fiscal year there were 52 Sundays and 7 holidays on which there were 67,937 visitors. Of these, 31,508 ascended in the elevator and 36,429 by the stairway. This gives an average of 1,151 persons on each of the 59 days.

5. STATUES AND THEIR PEDESTALS.

Attention has been given to all the completed statues during the year, and the pedestals and bronze figures have been maintained in a cleanly condition as far as practicable.

6. PROPAGATING GARDENS, INCLUDING GREENHOUSES AND NURSERY.

The various greenhouse structures were maintained in as good condition as the small appropriation would permit, and the plants were given necessary care and attention.

All decayed woodwork in the houses was replaced and the repaired work painted. The flues of boilers were cleaned and put in good order and heating pipes, water pipes, and boilers repaired.

The total number of plants propagated at the gardens was 696,427. Of these 617,427 were used for the parks and reservations and the greenhouses and the nursery under the charge of this office, 13,050 for the Capitol, and about 14,500 for other departments of the Government. The surplus remaining (about 51,450) was distributed to Government and municipal offices, hospitals, public institutions, etc.

The following list shows the stock grown, purchased, and distributed during the year:

Location.	Number.	Kinds.	No. of varieties.
Plants propagated and used for—			
Park planting	617,427	26	58
Stock greenhouses, nursery, and fall planting	45,000	15	200
Grounds of Treasury Department	2,825	5	8
Grounds of State, War and Navy Departments	5,900	12	18
Grounds of United States Capitol	13,050	20	30
Bureau of Engraving and Printing	3,000	12	19
Grounds of Interior Department	2,775	3	5
Pan-American Union	625	(1)	(1)
No. 24 Engine Company, District of Columbia Fire Department	275	(1)	(1)
Bureau of Standards	345	(1)	(1)
Columbia Hospital	425	(1)	(1)
Cantonments	1,305	(1)	(1)
Corcoran Gallery of Art	525	(1)	(1)
Episcopal Eye, Ear, and Throat Hospital	225	(1)	(1)
Fruit and Flour Guild	1,125	(1)	(1)
Fort Washington	325	(1)	(1)
Garfield Hospital	325	(1)	(1)
Industrial Home for Colored Children	375	(1)	(1)
Walter Reed Hospital	625	(1)	(1)
Total	696,427		
PLANTS PURCHASED.			
Hardy flowering bulbs	62,600	7	12
PLANTED IN VARIOUS PARKS.			
Bulbs for spring bloom	62,600	7	12
Pansies for spring bloom	25,000		
Bedding plants for summer decorations	617,427	26	58
Vases stocked for summer decorations	8		

(1) General stock.

Storehouse and shops, Propagating Gardens.—The tools, supplies, and other Government property in the storehouse and shops were cared for.

Repairs were made to push carts, wheelbarrows, lawnmowers, scythes, and rubber hose; saws, mattocks, picks, axes, and shears were ground; edged tools sharpened and kept in order, and new tools purchased from time to time as needed. The office horse was regularly shod by the blacksmith and the two automobiles were kept in good condition.

A sale of old, unserviceable, and condemned materials and tools was held on March 12, 1918, and the gross proceeds thereof, amounting to $1,226, deposited in the Treasury of the United States.

7. HOUSE NO. 516 TENTH STREET, NW., WHERE ABRAHAM LINCOLN DIED.

Minor repairs were made to the plumbing and heating fixtures and to woodwork. The ceiling in the kitchen was given four coats of paint. The ceiling and woodwork in the pantry were given two coats of paint.

8. BUILDINGS OCCUPIED AS OFFICES BY THE WAR DEPARTMENT, EXCEPT STATE, WAR AND NAVY DEPARTMENTS BUILDING.

All buildings occupied by the War Department, except the State, War, and Navy Departments Building, were inspected monthly to ascertain their structural safety, and the available means of fire protection.

The number of buildings thus occupied increased until in April, 1918, there were 72 of them. There were 60 buildings inspected during June, 1918.

All objectionable conditions found in buildings, such as overloading of floors, empty fire extinguishers, fire extinguishers requiring recharging, lack of fire extinguishers, accumulated rubbish, and any other menace to the safety of the building was reported to the heads of the bureaus which were directly responsible for the buildings.

An officer of the Engineer Reserve Corps was detailed by the Chief of Engineers to this office, during December and January to make a careful survey of the buildings occupied at that time and to determine the safe allowable floor load for each. This work was completed in a very satisfactory manner, and with very little inconvenience to the occupants of the buildings.

A list of the buildings occupied between July 1, 1917, and June 30, 1918, follows. This shows those vacated during the year and the dates.

Buildings occupied as offices by the War Department outside of State, War and Navy Departments Building.

Name and location of building.	Occupied by—	When first occupied.	When vacated.
Army Medical Museum, Seventh and B Streets SW.	Surgeon General	Occupied at beginning of fiscal year July 1, 1917.	
Ford's Theater Building, 509–511 Tenth Street NW.	Adjutant General		
610 Seventeenth Street NW	do		
1725 F Street NW	Bureau of Insular Affairs		
532 Seventeenth Street NW	Quartermaster General	Occupied at beginning of fiscal year July 1, 1917.	
1106 Connecticut Avenue NW	Surgeon General	do	
Winder Building Annex, rear 610 Seventeenth Street NW.	Chief of Ordnance	do	
War Department Stables, rear 610 Seventeenth Street NW.	Supply Division, War Department.	do	
Lemon Building, 1729 New York Avenue NW.	Office Public Buildings and Grounds, depot quartermaster, Fine Arts Commission, etc.	do	
1703–1705 New York Avenue NW.	Ordnance Department and Signal Office.	do	
National Savings and Trust Company Building, Fifteenth and New York Avenue.	Housing and Health Division, War Department.	do	
21 M Street NE	Surgeon General, supply depot	do	
462–464 Louisiana Avenue NW	Surgeon General	do	
236 Nineteenth Street NW	Quartermaster General	do	
238 Nineteeth Street NW	do	do	
240 Ninteenth Street NW	do	do	
1514 Eckington Place NE	do	do	
1710–1712 Pennsylvania Avenue NW.	Chief Signal officer	do	
Mills Building Annex, 1701 G Street NW.	Panama Canal Commission, Surgeon General.	do	
Munsey Building, 1311 E Street NW.	Aircraft Board; Council of National Defense.	do	
1801 I Street NW	War Credit Board and divisions of office of Secretary of War.	do	
1624 H Street NW	Ordnance Department and Inspector General.	do	June 30, 1918
1333–1335 F Street NW	Ordnance Department and Chief Signal Officer.	do	Apr. 30, 1918
1326 F Street NW	Ordnance Department	do	
Land Office Building, Seventh and E Streets NW.	Adjutant General, Chief of Engineers, Provost Marshal, Chief of Coast Artillery.	do	

***Buildings occupied as offices by the War Department outside of State, War and Navy Departments Buildings*—Continued.**

Name and location of building.	Occupied by—	When first occupied.	When vacated.
Mills Building, Seventeenth and G Streets NW.	Supply Division and Surgeon General.	Occupied at beginning of fiscal year, July, 1, 1917.	
Southern Railroad Building 119 D Street NE.	Signal Office and Aircraft Board.	Do.	
Glover Building, 1419 F Street NW.	Chief of Engineers.	Do.	
Sowers Building, 1312 New York Avenue, NW.	Adjutant General.	Aug. 1, 1917.	Apr. 10, 1918
Schwartz Building, 920 F Street, NW.	Ordnance Department and Signal Office.	Aug. 27, 1917.	June 19, 1918
Walker Building, 734 Fifteenth Street NW.	Director of Tank Service.	Aug. 1, 1917.	May 15, 1918
Maury Apartment House, Nineteenth and G Streets NW.	Surgeon General and Board of Training Camp Activities.	Nov. 1, 1917.	
1212 G Street NW.	Ordnance Office and Signal Office.	Oct. 20, 1917.	
1327 F Street NW.	Ordnance Department, Chief Signal Office.	Nov 1, 1917.	June 10, 1918
1907 F Street NW.	Surgeon General.	Sept. 1, 1917.	May 22, 1918
1829 I Street NW.	Chief of Ordnance.	Nov. 19, 1917.	May 26, 1918
1324 New York Avenue NW.	Adjutant General.	Sept. 25, 1917.	Apr. 10, 1918
Herdic stables, E Street, between Nineteenth and Twentieth Streets.	Supply Division, War Department.	Oct. 16, 1917.	
1607 H Street NW.	Chief Signal Officer.	Nov. 1, 1917.	
Monroe Building, Fifteenth and M Street NW.	Quartermaster General.	Sept. 7, 1917.	
718 Eighteenth Street NW.	Surgeon General.	Sept. 15, 1917.	May 22, 1918
909½ F Street NW.	Chief Signal Officer.	Nov. 10, 1917.	June 10, 1918
613–617 G Street NW.	do.	Nov. 1, 1917.	Apr. 15, 1918
1413 G Street NW.	Chief of Ordnance.	Sept. 22, 1917.	Jan. 18, 1918
1415 G Street NW.	do.	do.	Do.
1421 I Street NW.	Quartermaster General.	Sept. 15, 1917.	May 26, 1918
1438 U Street NW.	Chief of Engineers.	Nov. 7, 1917.	
1312 Massachusetts Avenue NW.	Quartermaster General.	Jan. 1, 1918.	Mar. 31, 1918
1314 Massachusetts Avenue NW.	do.	Dec. 8, 1917.	Apr. 14, 1918
645 F Street NW.	Chief Signal Officer.	Dec. 17, 1917.	June 30, 1918
Emery Building, First and B Streets NW.	Adjutant General.	Oct. 5, 1917.	
Aeroplane Exhibition Building, Tenth and B Streets SW.	Chief Signal Officer.	No record.	
1421 G Street NW.	Housing and Health Division, War Department.	Dec. 10, 1917.	Feb. 10, 1918
136 K Street NE.	Chief Signal Officer.	No record.	
Southern Building, Fifteenth and H Streets NW.	Chief of Engineers and Ord- and Fortification.	do.	
Union Trust Building, Fifteenth and H Streets NW.	Board of Ordnance and Fortification.	do.	
Southwest corner Eighteenth and E Streets NW.	Chief of Ordnance.	June 1, 1917.	
Eighteenth and B Streets NW.	Quartermaster General.	Oct. 4, 1917.	
1205 Fifteenth Street NW.	Quartermaster General, Chief of Staff.	Dec. 15, 1917.	Sept. 10, 1918
1715 New York Avenue NW.	Quartermaster General.	Jan. 21, 1918.	
1510 Eckington Place NE.	Chief of Engineers and Quartermaster General.	No record.	
Rear of 1510 Eckington Place NE.	do.	do.	June 19, 1918
Fourth and Channing Place NE.	Chief of Engineers.	do.	
First and M Streets NE.	Surgeon General.	do.	
Georgetown University Auditorium, Sixth between D and E Streets.	Quartermaster General.	Jan. 15, 1918.	June 30, 1918
1723 F Street NW.	War Department (telegraph and telephone building).	June 22, 1918.	
2028 M Street NW.	War Department stable.	Jan. 15, 1918.	
Auburn garage building, corner Twenty-fourth and M Streets NW.	Surgeon General and Adjutant General.	Feb. 1, 1918.	
Arcade Building, 3134–3138 Fourteenth Street NW.	Chief Signal Office.	Feb. 15, 1918.	
1702–1704 F Street NW.	Quartermaster General.	No record.	
Pettus Building, Nineteenth and and Virginia Avenue NW.	do.	Mar. 28, 1918.	
Ford Building, John Marshall Place and Pennsylvania Avenue NW.	Ordnance Department.	Feb. 1, 1918.	

NOTE.—The buildings listed were occupied for the entire year except those indicated as vacated before June 30, 1918.

The regular monthly inspections of these buildings require the services of a junior civil engineer for several days for each inspection. In addition to his services it requires the services of a clerk and stenographer to carry on the resulting correspondence. These employees can not well be spared at the present time for work outside of their regular duties.

9. STATE, WAR, AND NAVY DEPARTMENTS BUILDING.

The officer in charge of public buildings and grounds is the superintendent of this building. His detailed annual report is made to the commission in charge of the building.

10. DEPARTMENTAL TELEGRAPH LINE.

During the year the main battery and local batteries received necessary attention and were maintained in effective condition. All grounds and open circuits on the wires of the lines were removed as soon as possible and the line kept in good working order.

11. HIGHWAY BRIDGE ACROSS POTOMAC RIVER, D. C.

During the fiscal year the draw was opened 2,673 times for the passage of vessels or an average of approximately 7.32 openings per day. Two thousand eight hundred and nineteen vessels passed through the draw during that period.

The average daily travel over the bridge on the last seven days in June, 1918, was as follows: Single cars, 253.7; trains of two cars each, 203.4; automobiles, 2,272.4; motor trucks, 632.1; double teams, 167.8; single teams, 160.8; pedestrians, 329; equestrians, 9.1; bicycles, 144.5; motorcycles, 208.

All of the steelwork of the main trusses above the roadway level was given a coat of metallic paint, toned down with black. The steel handrail and overhanging steelwork was scraped clean and given two coats of pain on five spans. The joint between the cement walk and the steel curb plate was calked with slater's cement to prevent the seepage of water through to the supporting truss. Minor repairs were made to the asphalt roadway, draw, draw house, and machinery.

The contract that was entered into on June 2, 1917, for furnishing materials and labor and replacing with new piles and timbers, old piles and timbers in the upstream end of the center fender of the drawspan was completed, 90 piles being driven and 13,000 feet b. m. timbers used.

In February, 1918, high water and ice destroyed nearly all of the fender system, including the new work above referred to. An estimate in the sum of $50,000 for repairing the fender system was immediately submitted to Congress, which appropriated the sum asked for in the urgent deficiency act approved March 28, 1918. A contract for the work was entered into on June 29, 1918.

12. TREES, SHRUBS, PLANTS, FERTILIZERS, AND SKILLED LABOR FOR THE GROUNDS OF THE LIBRARY OF CONGRESS, THE CAPITOL, AND EXECUTIVE DEPARTMENTS.

Grounds of the Library of Congress.—During the summer months the evergreen beds were kept watered and cultivated, the privet hedges trimmed and shrubs pruned. In the fall the two beds in the courtyards were planted with 204 dwarf evergreens and 175 were planted in the beds on the east and west fronts, 140 cubic yards of well-rotted stable manure and 6 barrels of air-slacked lime were spread on the lawns. In April the evergreens that had not been winter killed were removed from the four triangular beds on the east and west fronts and replanted in the large circular beds to replace others that had been winter killed. Two of the triangular beds on the east front were replanted with 250 deciduous flowering shrubs and the two on the west front with summer-flowering plants.

Grounds of the Capitol.—During the summer and fall the flower beds and vases were kept in good condition, the shrubs pruned and cultivated. In October the summer-flowering and tropical plants were removed from the beds and vases to their winter quarters at the propagating gardens. The beds and borders were then spaded and planted with 1,260 dwarf evergreens, 19,100 bulbs, and 750 vines; of these, 960 dwarf evergreens, the bulbs, and vines were purchased in the fall and spring, the remaining 300 evergreens were taken from stock in the nursery, which had been purchased in previous years. In the latter part of April such evergreens as had not been winter killed were removed from the beds and vases and planted in the grounds, the beds were dug and planted with 13,050 summer-flowering plants, the vases filled with tropical plants and vines, and 84 aquatic plants were planted in the fountain basins.

Grounds of executive departments.—About 14,500 plants were furnished from the propagating gardens for improving the grounds of executive departments. These plants if purchased from commercial nurseries would have cost approximately $1,232.50.

13. UNITED STATES WHARF PROPERTY, WASHINGTON, D. C.

Under date of April 25, 1918, the Chief of Engineers granted authority to the commanding general of the District of Columbia Militia permission to erect a temporary building for offices and quarters on the wharf on the Potomac River at the foot of O Street SW., occupied by the militia under revocable license executed by the Chief of Engineers on February 26, 1903, and on June 18, 1918, the Chief of Engineers granted authority to the commanding general for the erection of an additional temporary structure at this location for sheltering automobiles. A condition of these permits is that the structures shall be removed when no longer needed for the purposes for which erected.

14. MONUMENT AND WHARF AT WAKEFIELD, VA., THE BIRTHPLACE OF WASHINGTON.

The United States watchman in charge gave the usual care to this property, and during the growing season kept the grass cut around the monument. In addition to this work, 45 new cedar posts were placed in the fence along the roadway leading from the wharf to the monument in the place of old rotted posts, and the wire in the fence was tightened. This was done in August under the supervision of the watchman by hired labor.

15. MEMORIAL TO GENERAL ULYSSES S. GRANT.

The sculptor, who is also one of the contractors for the construction and erection of the memorial completed the full size clay model of the equestrian group in May, 1918. This was inspected in that month by a committee of the Commission of Fine Arts which recommended its approval. A plaster cast of this model will be taken by the sculptor from which the bronze casting can be made.

16. STATUE TO COMMODORE JOHN BARRY.

There were no operations under this heading during the year.

17. MEMORIAL TO ABRAHAM LINCOLN.

Operations were continued upon the erection of this memorial. The superstructure of the building was completed by the general contractors under their contract dated February 11, 1914, and on October 26, three and one-half months before the expiration of the contract time, it was taken over by the representative of the Government and final payment made the contractor.

Several minor features, some of which can not be completed until work upon the approaches and terrace wall is more nearly finished, were eliminated from the building contract and included in a special contract amounting to $3,590. A special contract for the sum of $14,000 was also entered into for increasing the size and altering the design of the panel in the interior limestone wall back of the location of the statue of Lincoln. This was necessitated by the enlargement of the statue from the size in which it was originally planned, in order to make its proportions more in keeping with those of the building. Experiments with models had previously demonstrated that the statue as designed would be too small for the dominating position which it will occupy as the principal feature of the memorial. A contract was accordingly entered into on December 31 with the sculptor, Mr. Daniel C. French, to materially enlarge the statue, at an added cost of $43,400. Work was continued by the artist, Mr. Jules Guerin, upon his paintings for the decoration of the interior of the building. One of these paintings was nearly completed during the year.

The contractors for the erection of the approaches and the terrace wall around the building continued operations under this contract. This work has been carried on under difficulties incident to the existing war and the consequent scarcity of labor and the embarrassment of transportation facilities for bringing material to the site. The winter was a very severe one, and the long protracted freezing weather necessitated a suspension of operations for a portion of the time. There were completed during the year, however, 600 cubic yards of foundation concrete, 967.43 cubic yards of slab and wall concrete, 140 feet of 12-inch cast-iron pipe, 160 feet of 12-inch, 80 feet of 10-inch, 100 feet of 8-inch, and 500 feet of 6-inch galvanized iron pipe, 4,453 square feet of cobblestone panels, and 27,492 cubic feet of granite.

Of the $50,000 appropriated for the expenses of the commission and the cost of plans and designs there was expended to June 30 the sum of $49,019.97, leaving an unexpended balance of $980.03. Of the $2,594,000 appropriated for the erection of the memorial there was expended to June 30 the sum of $2,213,972.56, leaving an unexpended balance of $380,027.44. These balances will be required to pay outstanding obligations and future expenses.

(A photograph showing the condition of the work on June 30, 1918, accompanies this report.)

18. DISTRICT OF COLUMBIA ARMORY COMMISSION.

There were no operations under this project during the fiscal year.

19. COMMISSION OF FINE ARTS.

The officer in charge of public buildings and grounds is by law the secretary and disbursing officer of the commission. On September 24, 1917, Col. Wm. W. Harts, who had been ordered to military duty, was relieved by Col. C. S. Ridley, United States Army, as secretary and disbursing officer. The detailed annual report of the commission is made direct to the President.

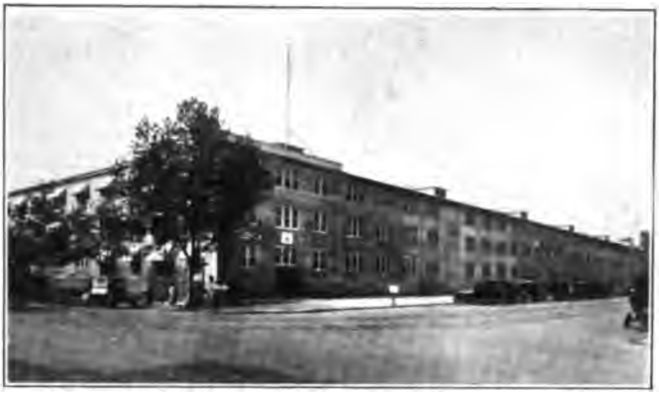
20. MEMORIAL TO THE WOMEN OF THE CIVIL WAR.

Operations were continued upon the construction of the masonry approaches to the building and upon the development of the grounds. This work was greatly delayed by the embarrassed condition of the labor market, and the difficulties incident to the transportation of the necessary materials, as well as by the unusual severity of the winter. The original contract time was extended to cover these delays, and the work was completed in May, 1918. The results have been very satisfactory, and provide an attractive setting for the building.

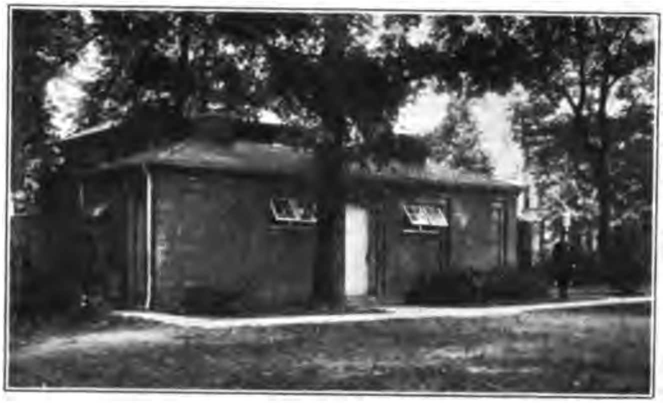
The contract for the electric-light fixtures was completed by the installation, in the spring of 1918, of the ornamental standards upon the east side of the driveway in front of the main entrance to the building.

Hedges of boxwood and California privet were placed around the grounds and along the driveway, and evergreens consisting of rhododendrons and azaleas were grouped about the base of the building and the buttresses of the entrance steps. A planting of creeping junipers was placed in front of the base for the balustrade along the eastern side of the driveway. Two well developed American elms were transplanted to suitable locations in the grounds. The lawn areas were sown with rye and grass seed. All of the planting material was given careful attention by skilled men and has made excellent growth.

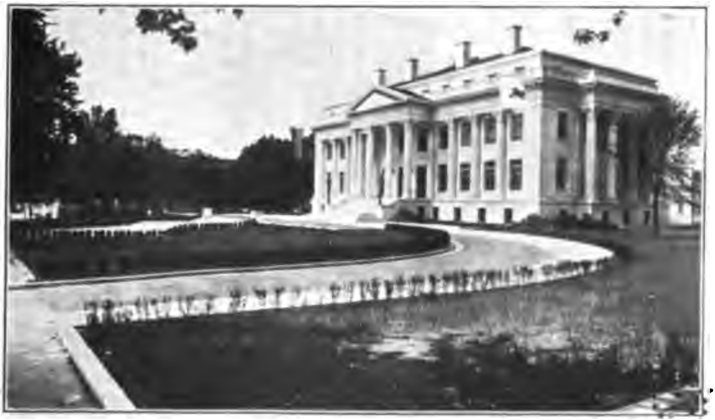
Permission was granted twice during the year to the American Red Cross to erect temporary buildings on the square occupied by the memorial. This was done in pursuance of authority granted by joint resolution of Congress approved by the President May 17, 1917. These additional buildings were needed to provide working space for the largely augmented forces of employees of the American Red Cross in connection with their work in the present war.



VIEW ON B STREET. ORDNANCE, BETWEEN SIXTH AND SEVENTH STREETS NW., WAR AND NAVY TEMPORARY OFFICE BUILDINGS. VIEW LOOKING SOUTHWEST.



PARK LODGE AND PUBLIC COMFORT STATION, MONTROSE PARK, GEORGETOWN. VIEW LOOKING SOUTHEAST.



MEMORIAL TO WOMEN OF THE CIVIL WAR. VIEW LOOKING SOUTHWEST.

3802-1

The funds available for the work of this commission came from the following sources:

Amount appropriated by the Government	$400,000.00
Amount of private contributions	426,829.50
Amount of interest on private contributions	29,680.09
Total	856,509.59

Of this amount there was expended to June 30 the sum of $855,916.51, leaving an unexpended balance of $593.08.

(A photograph showing the condition of the work on June 30, 1918, accompanies this report.)

21. ARLINGTON MEMORIAL AMPHITHEATER AND CHAPEL.

Operations were continued throughout the fiscal year upon the erection of the memorial. The principal items placed in building during the year were as follows: 57,711 cubic feet of exterior marble, 257,100 red brick, 12,000 square feet of damp-proofing, 2,616 square feet of copper flashing, 33,928 square feet of cement finish, 4,790 square feet of marble floors, 4,694 square feet of marble stairs, 2,033 linear feet of marble wall base, 1,272 square feet of marble door and window frames, 1,060 cubic feet of marble interior columns, pilasters, and balustrade, 4,526 cubic feet of concrete steps and slabs, 700 square yards of furring and lathing, 1,711 square yards of plain plastering, and 3,779 feet girths of ornamental plastering, 8,099 square feet of terra cotta partition, 4,000 cubic feet of cinder concrete, ash lift and dumb-waiter complete, 500 square feet of terrazo floor, and other work on which payments were made to the contractors based on the following valuations: Bronze doors and grilles, $6,650; ornamental iron steps and railings, $1,800; interior woodwork, $2,244; hardware, $1,543.25; plumbing, $2,489.43; electrical work, $346.40; glazing, $400; range, $170; painting, $1,020; heating, $544, and carving, $2,933.

Work was also continued upon the construction of the masonry approaches, for which a contract had been entered into in December, 1916. Much difficulty was experienced in getting this work under way, because of the lack of means for transporting the necessary granite from the quarries, which are located on an island off the coast of Maine. The railroads were so congested with freight that they could not handle the material and no vessel for marine shipment could be secured. When this stone was finally delivered in part at the site the severity of the winter and the protracted freezing weather rendered masonry construction impracticable. The work was resumed in the spring and has progressed slowly under the conditions incident to the prosecution of the present war. During the year there were placed in the approaches 214 cubic yards of concrete footings, 183 cubic yards of wall and slab concrete, 100 square feet of reinforced concrete slab, 87 cubic feet of bluestone, and 3,245 cubic feet of granite.

Of the $750,000 appropriated for the construction of this memorial, there was expended to June 30 the sum of $554,719.10 leaving an unexpended balance of $195,280.90 all of which will be required in executing the approved plans.

(A photograph showing the condition of the work on June 30, 1918, accompanies this report.)

22. MONUMENT TO FRANCIS SCOTT KEY AND OTHERS.

This is authorized in deficiency appropriation act approved July 29, 1914, which provides that the monument shall be erected at Fort McHenry, Baltimore, Md., under the direction of the Secretary of War, and appropriates $75,000 for the purpose.

By direction of the Secretary the officer in charge of public buildings and grounds acts as the personal representative of the Secretary of War in the supervision of the construction of the monument. He is also the disbursing officer of the funds appropriated.

During the fiscal year the marble for the seats and posts which are to be placed around the outside of the circular roadway that is to surround the monument has been cut and that for the base (or drum) on which the statue is to stand nearly completed. The full size models of the statue and of the figures which are to be carved upon the base have been completed, approved, and payment made the contractor therefor under the terms of the contract. The full size bronze casting of the statue will now be made.

As a base hospital has been established at Fort McHenry and numerous buildings erected therefor, some of which overlap the site selected for the monument and its surroundings, the erection of the monument is to be deferred during the present emergency. The question of storing the statue and other materials until after the close of the war is now being considered.

23. ARLINGTON MEMORIAL BRIDGE COMMISSION.

On December 13, 1915, the officer in charge of public buildings and grounds was designated as the executive and disbursing officer of this commission, which was created by section 23 of the public buildings act of March 4, 1913 (37 Stats., p. 885). There were no operations during the fiscal year, as no appropriation has been made for the expenses of the commission, which for that reason has been unable as yet to enter upon its duties.

24. PUBLIC BUILDINGS COMMISSION.

The act of Congress approved July 1, 1916, created a Public Buildings Commission composed of the chairman of the Senate Committee on Appropriations and two other members of that committee; the chairman of the Senate Committee on Public Buildings and Grounds and two other members of that committee; the chairman of the Committee on Appropriations of the House of Representatives and two other members of that committee; the chairman of the Committee on Public Buildings and Grounds of the House of Representatives and two other members of that committee; the Superintendent of the Capitol Building and Grounds; the officer in charge of public buildings and grounds; and the Supervising Architect of the Treasury—15 members in all. The duties imposed by the act upon this commission were to investigate and ascertain what public buildings are needed in the District of Columbia to provide suitable and adequate accommodations with allowances for future expansion for all of the offices, establishments, and public services of the Government in the District of Columbia, the proper location of such buildings, the probable cost thereof, and the probable cost of such new sites as they may deem it necessary for the Government to acquire.

In addition to being a member of the commission the officer in charge of public buildings and grounds was also its executive and disbursing officer.

The commission completed its labors and submitted its report to Congress in December, 1917.

ABSTRACT OF CONTRACTS IN FORCE DURING THE FISCAL YEAR ENDING JUNE 30, 1918, UNDER THE OFFICE OF PUBLIC BUILDINGS AND GROUNDS, WASHINGTON, D. C.

Contractor: Charles H. Niehaus, New Rochelle, N. Y., for furnishing materials and labor and constructing and erecting a monument to Francis Scott Key and others in Fort McHenry Park, Baltimore, Md.
Date of contract: October 19, 1916.
Approved: Authority Secretary of War.
Date of commencement: October 19, 1916.
Date of completion: April 19, 1919.

Contractor: Clarke & Winston Co. (Inc.), Washington, D. C., for furnishing materials and labor and making repairs to the center fender of the Highway Bridge across Potomac River, D. C.
Date of contract: June 2, 1917.
Approved: Emergency contract.
Date of commencement: Within 15 days after date of contract.
Date of completion: Within six weeks from the time of arrival of all material in Washington.

Contractor: Charles H. Tompkins, Washington, D. C., for furnishing materials and labor and constructing new cement walks, coping, and steps and stone walls at High Service Reservoir Park, Washington, D. C.
Date of contract: June 15, 1917.
Approved: Emergency contract.
Date of commencement: Within seven days after date of contract.
Date of completion: Within 90 days after date of contract.

Contractor: A. C. Moses Construction Co., Washington, D. C., for constructing the end wing with porches and colonnades of a field house in East Potomac Park, Washington, D. C.
Date of contract: June 19, 1917.
Approved: July 18, 1917.
Date of commencement: Within 30 days after date of receipt of notification of approval of contract by Chief of Engineers.
Date of completion: Within 10 months after date of receipt of said notification.

Contractor: United States Casualty Co., New York, N. Y., for making monthly inspections of the elevator and machinery in the Washington National Monument, Washington, D. C., during fiscal year ending June 30, 1918.
Date of contract: June 22, 1917.
Approved: Emergency contract.
Date of commencement: July 1, 1917.
Date of completion: June 30, 1918.

Contractor: American Mosaic Co., Washington, D. C., for furnishing materials and labor and constructing new terrazo floors, marble wainscoting, and partitions in lodge house at Washington Monument, Washington, D. C.
Date of contract: June 25, 1917.
Approved: Emergency contract.
Date of commencement: Within five days after date of contract.
Date of completion: Within 70 days after date of contract.

Contractor: Carroll Electric Co., Washington, D. C., for furnishing and installing a new centrifugal pump and motor for operating the fountain on Union Station Plaza, Washington, D. C.
Approved: Emergency contract.
Date of commencement: Undetermined.
Date of completion: January 1, 1918.

Date of contract: June 27, 1917.
Approved: Emergency contract.
Date of commencement: Within five days after date of contract.
Date of completion: Within three months after date of contract.

Contractor: R. W. Henderson, Washington, D. C., for upholstery and drapery work for the Executive Mansion, Washington, D. C.
Date of contract: September 4, 1917.
Approved: Emergency contract.
Date of commencement: Undetermined.
Date of completion: January 1, 1918.

Contractor: John J. Earley, Washington, D. C., for completing the construction of an arched entrance to the west side of Meridian Hill Park, Washington, D. C.
Date of contract: September 6, 1917.
Approved: September 14, 1917.
Date of commencement: Within 10 days after date of receipt of notification of approval.
Date of completion: Within 90 days of suitable working weather after date of receipt of notification.

Contractor: James B. Henderson, Washington, D. C., for upholstery and drapery work for the Executive Mansion, Washington, D. C.
Date of contract: September 11, 1917.
Approved: Emergency contract.
Date of commencement: Undetermined.
Date of completion: January 1, 1918.

Contractor: Trussed Concrete Co., Youngstown, Ohio, furnishing materials and labor for constructing two portable steel buildings in the Propagating Gardens, Washington, D. C.
Date of contract: September 22, 1917.
Approved: Emergency contract.
Date of commencement: Within five days after date of contract.
Date of completion: Within 30 days after date of contract.

Contractor: Electro Bleaching Gas Co., for furnishing and installing a liquid chlorine plant for purifying the water in the Tidal Basin in Potomac Park.
Date of contract: September 22, 1917.
Approved: Emergency contract.
Date of commencement: Undetermined.
Date of completion: June 30, 1918.

Contractor: George A. Fuller Co., New York, N. Y., for furnishing materials and labor for constructing temporary office buildings in Henry Park, Washington, D. C.
Date of contract: October 11, 1917.
Approved: October 19, 1917.
Date of commencement: Undetermined.
Date of completion: Four months from date of contract.

Contractor: Wurdeman & Co., Washington, D. C., for upholstery and drapery work for the Executive Mansion, Washington, D. C.
Date of contract: November 3, 1917.
Approved: Emergency contract.
Date of commencement: Undetermined.
Date of completion: January 1, 1918.

Contractor: The Globe Automatic Sprinkler Co., Philadelphia, Pa., for an automatic sprinkler system in group A of the War and Navy Office Buildings in Henry Park, Washington, D. C.
Date of contract: December 27, 1918.
Approved: Emergency contract.
Date of commencement: Undetermined.
Date of completion: Within 6 weeks after date of contract.

Contractor: General Fire Extinguisher Co., Providence, R. I., for an automatic sprinkler system in group C of the War and Navy Office Buildings in Henry Park, Washington, D. C.
Date of contract: February 7, 1918.
Approved: Emergency contract.
Date of commencement: Immediately.
Date of completion: Within 40 days after date of contract.

Contractor: Globe Automatic Sprinkler Co., Philadelphia, Pa., for an automatic sprinkler system in group B of the War and Navy Office Buildings in Henry Park, Washington, D. C.
Date of contract: February 9, 1918.
Approved: Emergency contract.
Date of commencement: Undetermined.
Date of completion: Within 40 days after date of contract.

Contractor: George A. Fuller Co., New York, N. Y., for a temporary building for use as a restaurant in Henry Park, Washington, D. C.
Date of contract: February 18, 1918.
Approved: Emergency contract.
Date of commencement: Indefinite.
Date of completion: Indefinite.

Contractor: George A. Fuller Co., New York, N. Y., modifying contract of October 11, 1917, for constructing temporary office buildings in Henry Park, Washington, D. C.
Date of contract: March 4, 1918.
Approved: March 23, 1918.
Date of commencement: Not mentioned.
Date of completion: Indefinite.

Contractor: A. C. Moses Construction Co., Washington, D. C., modifying the contract of June 19, 1917, for constructing the end wings with porches and colonnades of a field house in East Potomac Park, Washington, D. C.
Date of contract: April 20, 1918.
Approved—May 7, 1918, by Chief of Engineers; May 9, 1918, by Secretary of war.
Date of commencement: Indefinite.
Date of completion: Same as original contract.

Contractor: Hyde & Baxter, Takoma Park, Md., for the construction and erection of a bathing establishment on the shores of the Tidal Basin in west Potomac Park, Washington, D. C.
Date of contract: May 13, 1918.
Approved: Emergency contract.
Date of commencement: May 23, 1918.
Date of completion: July 18, 1918.

Contractor: Charles H. Tompkins, Washington, D. C., underpinning south end of upper retaining wall at Meridian Hill Park, Washington, D. C.
Date of contract: June 26, 1918.
Approved: Emergency contract.
Date of commencement: Within 10 days after date of contract.
Date of completion: Within 40 days of suitable working weather after date of commencement.

Contractor: George Hyman, Washington, D. C., for excavating, grading, and removing earth at Meridian Hill Park, Washington, D. C.
Date of contract: June 26, 1918.
Approved: Emergency contract.
Date of commencement: Within 15 days after date of contract.
Date of completion: Within three months after date of commencement.

Contractor: Clarke & Winston Co., Washington, D. C., for replacing the fenders of the Highway Bridge across the Potomac River, D. C.
Date of contract: June 29, 1918.
Approved: Emergency contract.

Date of commencement: Within 15 days after date of contract.
Date of completion: Within six months after date of commencement.

Contractor: A. C. Moses Construction Co. ,Washington, D. C., for furnishing materials, equipment and labor and constructing a new public comfort station in Willow Tree Park, Washington, D. C.
Date of contract: June 29, 1918.
Approved: Emergency contract.
Date of commencement: Within 10 days after date of contract.
Date of completion: Within 90 days of suitable working weather after date of commencement.

NORTHERN AND NORTHWESTERN LAKES (CORRECTING AND ISSUING CHARTS, SURVEYS, INVESTIGATION OF LAKE LEVELS); PRESERVATION OF NIAGARA FALLS (SUPERVISION OF POWER COMPANIES).

REPORT OF F. G. RAY, ASSISTANT ENGINEER IN CHARGE.

SURVEY OF NORTHERN AND NORTHWESTERN LAKES.

OPERATIONS DURING THE FISCAL YEAR.

CHARTS.

Chart supervision.—The reduction, preparation, and reproduction of charts have continued under the immediate supervision and direction of Assistant Engineer Edward Molitor, and Chief Draftsman Andrew J. Swift.

Charts sold and issued.—The following statement shows the number of charts received and disposed of at this office during the fiscal year ending June 30, 1918:

On hand July 1, 1917	59, 279
Prepared by this office	25, 074
Previously disposed of, returned to stock	2
Total	84, 355
Sold	12, 030
Issued for official use	4, 591
Transferred to United States Engineer offices, Buffalo and New York City	2, 353
Destroyed (out of date)	1, 468
On hand July 1, 1918	63, 913
Total	84, 355

The total number of charts sold by this office during the year was 12,030, the total amount received from these sales being $2,904.55, which was duly deposited to the credit of the Treasurer of the United States. The total number of charts that have been sold, issued, and transferred through this office to June 30, 1918, is 573,368, including those transferred to the United States Engineer offices at Buffalo and New York, N. Y.

Of the five general charts of the Great Lakes, published under terms of agreement noted on page 2703 of the Annual Report of the Chief of Engineers for 1910, from copperplates loaned by the Hydrographic Office, United States Navy, 78 were issued, 28 transferred to New York, N. Y., 16 were canceled, and 139 sold for a total of $30.50. These figures are included in the above statements.

Corrected and revised charts printed.—The work during the year pertaining to republishing existing charts of the series embraced corrections for changes constantly being made in lights and other aids to navigation, modifications due to river and harbor improvements, latest magnetic determinations, additional and corrected sailing courses, and topographic and hydrographic changes developed by commercial and industrial enterprise on the shores of the Lakes and their tributary and connecting waters. In cases where geodetic control had not already been referred to the standard datum of 1901, and where soundings had not been referred to the standard low-water planes approved March 16, 1909, the charts were so revised, whenever practicable. Charts in stock were corrected as far as practicable for all information received to the day of issue, a large number of the more extensive corrections being printed on the power press from specially prepared lithographic stones.

In the statement of work on charts given below the edition number has reference only to the editions lithographed in colors, many charts having previously appeared as black prints from the original engraved copperplates. Copies of charts were corrected to date, the engravings on stone or copperplate correspondingly modified, transfers made to stone, color plates prepared, and the charts printed in colors, as follows:

1. Coast chart No. 2, Lake Ontario, scale 1:80,000 (inset Oswego, N. Y., Molitor-process copperplates, scale 1:8,000); revised to both standards and projection added to inset; fourth edition, from engraved copperplate; 736 copies printed in six colors; issued July 10, 1917.

2. Upper Niagara River, Lake Erie to the Falls, including Buffalo Harbor, scale 1:30,000; seventh edition, from stone engraving; 1,381 copies printed in five colors; issued July 14, 1917.

3. Fairport Harbor, Ohio, scale 1:8,000; fourth edition, from Molitor-process copperplates; 497 copies printed in five colors; issued August 4, 1917.

4. Coast chart No. 1, Lake Ontario, scale 1:80,000; sixth edition, from engraved copperplates; 1,488 copies printed in five colors; issued August 7, 1917.

5. North End of Lake Michigan, including Green Bay, scale 1:240,000; fourth edition, from stone engraving; 1,457 copies printed in five colors; issued August 22, 1917.

6. Coast chart No. 1, Lake Superior, scale 1:120,000 (inset Gargantua, Ontario, Molitor-process copperplate, scale 1:20,000 projection added); third edition, from Molitor-process copperplate, 976 copies printed in five colors; issued September 12, 1917.

7. Islands in Lake Erie, scale 1:40,000, second edition, from stone engraving; 696 copies printed in five colors; issued September 29, 1917.

8. Ludington Harbor, Mich., scale 1:8,000; second edition, from Molitor-process copperplate; 579 copies printed in five colors; issued October 4, 1917.

9. St. Marys River No. 2, scale 1:40,000; tenth edition, from heliogravure copperplate; 1,496 copies printed in five colors; issued October 10, 1917.

10. Cleveland Harbor, Ohio, scale 1:15,000; sixth edition, from stone engraving; 511 copies printed in five colors; issued October 31, 1917.

11. St. Marys River No. 3, scale 1:40,000 (inset Sault Ste. Marie, heliogravure copperplate, scale 1:20,000); eighth edition, from heliogravure copperplate; 1,498 copies printed in five colors; issued December 7, 1917.

12. St. Clair River, scale 1:40 000 (insets vicinity of St. Clair, vicinity of Marine City, Russell Island and Algonac, stone engravings, scales 1:16,000); fifth edition, from stone engraving; 2,125 copies printed in five colors; issued December 20, 1917.

13. Head of Green Bay, Wis., scale 1:25,000; third edition, from stone engraving; 575 copies printed in five colors; issued December 21, 1917.

14. Saginaw River, Mich., scale 1:15,000; second edition, from stone engraving; 297 copies printed in five colors; issued December 27, 1917.

15. St. Lawrence River No. 5, scale 1:30,000; sixth edition, from copperplate engraving; 1,081 copies printed in five colors; issued January 17, 1918.

16. Dunkirk Harbor, N. Y., scale 1:8,000; third edition, from stone engraving; 476 copies printed in five colors; issued March 6, 1918.

17. Apostle Islands, Wis., scale 1:60,000; third edition, from stone engraving; 752 copies printed in six colors; issued March 22, 1918.

18. St. Joseph and Benton Harbor, Mich., scale 1:8,000; second edition, from Molitor-process copperplate; 491 copies printed in five colors; issued March 30, 1918.

19. Muskegon Harbor, Mich., scale 1:15,000; fourth edition, from Molitor-process copperplate; 481 copies printed in five colors; issued April 15, 1918.

20. Hydrographic Office chart of Lake Huron; third edition, from engraved copperplate; 729 copies printed in five colors; issued April 23, 1918.

21. Ashtabula Harbor, Ohio, scale 1:5,000; sixth edition, from Molitor-process copperplate; 547 copies printed in six colors; issued May 27, 1918.

22. Manitowoc Harbor, Wis., scale 1:8,000; third edition, from Molitor-process copperplate; 516 copies printed in five colors; issued June 15, 1918.

Corrected and revised charts in progress.—At the close of the year the engravings for five charts were undergoing correction or revision preparatory to the issue of new editions. One of these charts was being revised to standard low-water datum.

New charts printed.—The following new charts were completed and issued in colors during the year:

1. White Lake Harbor, Mich., scale 1:15,000; first edition, from engraved copperplate; 513 copies printed in five colors; issued August 6, 1917.

2. New York State Canals No. 7 (Cayuga and Seneca Lakes), scale 1:60,000; first edition. from stone engraving; 994 copies printed in five colors; issued August 15, 1917.

3. Grand Island, Mich., scale 1:25,000; with inset of Munising (heliogravure copperplate reduction from existing harbor chart), scale 1:12,000; new stone engraving, for fourth edition; 745 copies printed in six colors; issued December 15, 1917.

4. Coast chart No. 2. Lake Michigan, scale 1:120,000; with insets of Strawberry Channel, Wis. (old stone engraving), scale 1:60,000, Oconto, Wis. (new stone engraving), scale 1:20,000, and Algoma, Wis. (new stone engraving), scale 1:12,000; new stone engraving, for fourth edition; 1,233 copies printed in five colors; issued March 20, 1918.

5. Coast chart No. 2, Lake Superior, scale 1:120,000; with inset of Grand Marais (Molitor-process copperplate), scale 1:16,000; first edition, from stone engraving; 740 copies printed in five colors; issued May 7, 1918.

New charts in progress.—The following new charts are being prepared, and at the close of the fiscal year the work had progressed as stated below:

1. Saginaw, Mich., scale 1:30,000; new chart of entire river, to supersede existing chart of lower river to Bay City; copperplate engraving in three sections completed, transferred to printing stone. black proof submitted for approval. and color stones in preparation.

2. Charlotte Harbor, N. Y., scale 1:10,000; new engraving on copper, in two sections, for third edition, nearly completed.

3. Coast chart No. 2, Lake Huron, scale 1:120,000; new engraving on stone, in four sections, for third edition, well advanced.

4. Buffalo Harbor, N. Y., scale 1:15.000; new chart, being engraved on stone, in two sections.

5. Maumee Bay and River, Ohio, scale 1:30,000; new engraving on stone, in two sections, for sixth edition, well advanced.

6. Lake of the Woods No. 21; new chart, to be reproduced by photolithography; drawing practically completed.

MISCELLANEOUS LITHOGRAPHIC WORK.

In addition to the chart operations above reported, other items of work were accomplished as detailed below, either in connection with regular Lake Survey functions or for other Government agencies. In cases where the expenses of work performed for other offices were first assumed by the Lake Survey appropriation, the amounts have been or will be reimbursed to this appropriation by proper transfer settlement.

1. *For the United States engineer office, Detroit, Mich.*—Map of vicinity of Sault Ste Marie, Mich., and Ontario, scale 1:20,000; transfer was made from the original stone engraving, color stones prepared, and 2,000 copies printed in three colors, for insertion in Statistical Report of Lake Commerce for the year 1917; February, 1918.

2. *For the commanding officer, Three hundred and eleventh Engineers, Camp Grant, Ill.*—A map of Camp Grant in four sheets, scale 1:5,000, was reduced by photolithography to one map scale 1:10,000, and 6,000 copies printed in black; completed February, 1918.

3. *For the division engineer, Eighty-ninth Division, Camp Funston, Kans.*—The following maps of Fort Riley Reservation, Kans., were reproduced by photolithography and printed in black; completed March, 1918:

1,000 copies each of 16 maps, scale 1:5,000.
2,500 copies each of 4 maps, scale 1:10,000.
2,500 copies each of 1 map, scale 1:20,000.
2,500 copies each of 1 map, scale 1:40,000.

4. *For the department engineer, Southern Department, Fort Sam Houston, Tex.*—Three maps were reproduced by photolithography, and editions of 1,500 copies of one map in two sections and 1,000 copies of two maps, each in two sections, were printed in black; completed April, 1918.

5. *Sundry Lake survey work.*—One thousand copies of diagrams for traverse computations were printed in blue.

The rainfall chart published in 1905 was photolithographed, new stations added, and 100 copies printed in black.

Insets for Bulletin No. 27. An extract from stone engraving of Chicago Lake Front Chart No. 1, scale 1:40,000, was corrected to show changes due to breakwater construction. Also a reproduction from drawing of the latest survey of Grays Reef Passage, Lake Michigan, was made by photolithography. Editions of 2,300 copies of the two insets were printed in three colors, and inserted in Bulletin No. 27, issued April, 1918.

Miscellaneous printing for office purposes included 6,000 letterheads, 50 copies of hydrograph of levels of Great Lakes, and 100 sheets of cross-section paper.

BULLETINS.

The subject matter for the bulletin and supplements has been edited and their publication (under contract) supervised by Mr. O. C. Hattery.

The numbers published during the year are as follows: Supplements Nos. 3, 4, 5, 6, and 7 to Bulletin No. 26, issued on July 19, August 17, September 19, October 19, and November 20, 1917; Bulletin No. 27, issued April, 1918; and Supplements Nos. 1 and 2 to Bulletin No. 27, issued on May 21 and June 18, 1918, respectively.

Supplements Nos. 3 to 7, Bulletin No. 26, covered all reported changes of interest to navigators arising between July and November, 1917.

Bulletin No. 27, thoroughly revised, and giving the latest information obtainable as to channels, harbors, obstructions, and other matters of interest to navigators over the entire lakes and connecting waters, was issued in April, 1918. As occasion arises, small maps, showing locations of new shoals, changes in important channels, harbors not otherwise charted, etc., are inserted in the bulletins and supplements. Two insets appear in Bulletin No. 27; one of the outer harbor at Chicago, showing changes due to new breakwater construction; and one of Grays Reef Passage, Lake Michigan, showing conditions found by the latest survey of this locality.

Supplements Nos. 1 and 2, Bulletin No. 27, issued prior to the close of the fiscal year, covered all changes received to June 15, 1918.

The present edition of the publication is 2,300 copies.

SURVEYS.

Field and office work pertaining to topographic and hydrographic surveys, hydraulics, magnetic observations, triangulation, and water levels were continued throughout the year under the general supervision of the present district engineer, who until October 23, 1917, was assistant to the officer in charge.

On July 1, 1917, four parties were engaged on surveys on the Great Lakes and one on the Lake of the Woods. The work of the latter was suspended on September 26 and its technical force transferred to Niagara Falls, N. Y., to assist on surveys in charge of the division engineer, Lakes Division, in connection with the "Investigation of water diversion from the Great Lakes and Niagara River." The hydrographic survey of Lake Erie was suspended on October 20 and eight members of the party transferred to the work at Niagara Falls. The remaining three parties continued their operations until the close of the season. During the present season four field parties have resumed work on the Great Lakes. A brief description of the operations of these several parties follows.

West end of Lake Erie.—At the beginning of the year the general resurvey of the west end of Lake Erie, which has been in progress continuously during field seasons since October, 1914, was being extended easterly from a line joining Ward Canal, on the south shore, and West Sister Island. This work, as heretofore, consists principally of sweeping in the open waters of the lake outside of the 18-foot contour and the determination of the character, extent, and least depth of each shoal or obstruction that may be encountered. New topographic surveys of the adjacent shores are made as the work progresses, usually at times when weather conditions are unfavorable for hydrography. Sufficient triangulation is executed for control and location. The party, in charge of Assistant Engineer M. S. MacDiarmid, was quartered in the steamer *Surveyor.* Work was suspended on October 20, at which time the hydrography had been completed to a line joining West Sister Island and Niagara Reef, where it joined with previous resurveys in this section of the lake. A total area of 40 square miles was swept after July 1. Two rock shoals about 2½ and 5 miles, respectively, west of Niagara Reef Gas Buoy were the only important discoveries. Many submerged net stakes were encountered, seriously hampering the progress of the sweeping. The topographic surveys were continued from French Creek just east of Locust Point to Lacarpe Creek, a distance of 7 miles. Control for hydrography and topography was established from station Locust Point (described in last year's report), West Sister Island lighthouse, and Perry Monument.

In April, 1918, Mr. MacDiarmid, in charge of a small party, went to Amherstburg, Ontario, with a Lake Survey launch and sweeping apparatus to cooperate with representatives of the Pittsburgh Steamship Co. in making a search for the wreck of the steamer *Henry Cort.* This vessel sank in Lake Erie a few miles east of Detroit River Light in December, 1917, after colliding with the steamer *Midvale.* The storms and ice of the following winter carried away the spars and upper works, leaving nothing visible, and an extended search by the owners in the early spring failed to reveal its location.

The Lake Survey party, after about a week of delay, due to unfavorable weather, succeeded in locating the vessel on April 24, the first good day. The wreck was found near the down-bound sailing course 9½ miles S. E. by E. ⅝ E. from Detroit River Lighthouse, it having been moved about 5 miles by the ice. With 8 feet depth of water over its decks and in its location the wreck was a dangerous menace to navigation, and hence the find was an important one.

The steamer *Surveyor* and party resumed operations in Lake Erie on May 22, 1918, beginning just east of Colchester Light and extending the sweeping work of previous seasons easterly toward Pelee Passage. An area of 56 square miles was covered up to June 30. Control was established from station Mettawas and Colchester, Pelee Island, and Pelee Passage Lighthouse. The wreck of the steamer *Jay Gould*, which sank on June 17, 1918, 3.6 miles N. E. ¼ N. from Southeast Shoal lightship, was located on June 19.

North end of Lake Huron.—Resurveys at the northerly end of Lake Huron were being carried on at the beginning of the year by a party in charge of Junior Engineer Ira C. Sunderland on the steamer *Col. J. L. Lusk*. The work had then been completed easterly to the vicinity of Gravel Island off the south shore of Drummond Island. Operations in this region were continued until September 8, this date marking the completion of the survey project for Lake Huron. After July 1 the work accomplished included sweeping and sounding of Detour Passage, below Frying Pan Island and in False Detour Passage and Scammon Cove, sweeping between the 3 and 11 fathom contours from Gravel Island to the entrance of False Detour Passage and sounding outside of this latter area to a distance of 5 miles from shore. The hydrography, after July 1, covered a total area of 115 square miles, of which 59 square miles were swept.

The topographic survey on Drummond Island was extended along the south and east shores to Marble Head, a distance of 34 miles. Water triangulation was used to establish control for hydrography and topography along the Lake Huron shore. Stations of the St. Marys River triangulation, and Boundary Monuments in False Detour Passage, furnished locations for the work in the two passages.

Important changes from data of the original surveys were developed by both the hydrography and topography.

Upon completion of the Lake Huron surveys the party proceeded to Sault Ste. Marie, Mich., and began work in Whitefish Bay, Lake Superior.

East end of Lake Superior.—Surveys in Whitefish Bay, Lake Superior, were started September 10, 1917. As projected this work is to include sweeping between the 3 and 11 fathom contours along the westerly shore, and the examination, by sounding and sweeping, of the two distinct ridges which extend northerly across the bay, the easterly reaching through Isle Parisienne and the Sandy islands to Pancake Bay on the Canadian shore, and the westerly passing west of Isle Parisienne and extending to Coppermine Point and Rousseau Bank. These ridges are to be sounded to depths of 20 fathoms and all areas with depths of less than eleven fathoms are to be swept.

The work was started from a line joining Point Iroquois and Gros Cap and at the close of the season the shoal area at the southerly end of the bay westward to Salt Point had been swept, and the sounding of the ridges had been extended to the vicinity of Isle Parisienne, the easterly as far as the south end of the island, and the westerly to abreast the center of the island. This work included 25 square miles of sweeping and an additional 58 square miles of soundings. The triangulation established in 1895–96 served for control. A newly discovered shoal with least depth of 15 feet at standard low water was located 2½ miles N. W. ¾ W. from Point Iroquois Light. Work in the bay was suspended October 28 and the steamer and party went to the Straits of Mackinac to assist with the remeasurement of the Mackinaw base line, and from there proceeded to Detroit, arriving on November 10.

The party departed from Detroit on May 21, 1918, and, after inspecting three automatic gages en route, reached Sault Ste. Marie May 26. Surveys in Whitefish Bay were then resumed, starting with hydrography along the westerly shore in the vicinity of Emerson and Sheldrake. This was continued until June 18, after which the party was engaged in sweeping westerly from Whitefish Point. On June 30 the work had progressed to Vermilion Coast Guard station. The hydrography accomplished up to the end of the fiscal year consisted of 41 square miles of sweeping and 10 square miles of sounding. No important discoveries were made during the present season. The hydrography was located by means of shore signals whose positions were determined by shore line traverse from Emerson to Crisp Point, a distance of 33 miles.

North end of Lake Michigan.—A party, quartered on the steamer *Search*, and in charge of Junior Engineer Sherman Moore, was stationed at Manistique, Mich., at the beginning of the year. Its work was the continuation of the general resurveys on Lake Michigan, which had then been completed down the west short to Manistique, with the exception of inshore sounding on Wiggins Reef and in the harbor at Thompson, Mich. The hydrography, consisting of sweeping between the 3 and 11 fathom contours, and sounding outside of the 11 fathom contour where required to cover a belt 5 miles wide along the shore, was extended during the season eastward to Scott Point. The total area covered after July 1 was 139 square miles, of which 64 square miles were swept.

Several uncharted shoals were discovered. The most important of these are located as follows; One about a mile south of the entrance to Manistique Harbor with least depth of 18 feet, one a mile south of Scott Point with least depth of 15 feet, and several scattered shoals lying southerly of Farnsworth Point with least depths of 16 to 19 feet, the outermost with 19 feet being 2¼ miles from shore and directly on the charted sailing course between Manistique and Squaw Island. The depths named are below low-water reference plane.

The shore-line survey was extended from Farnsworth Point to Scott Point, a distance of 28 miles.

The difficulties in establishing control for the surveys east of Manistique were unusual, due to the distance from the existing triangulation and the necessity of closing the work on the long lines of the primary in the northeast end of the lake. A system of water triangulation was carried eastward to Seul Choix Point and a tie made across to Squaw Island Lighthouse through a quadrilateral formed by the lighthouses on Squaw Island and Seul Choix Point and stations on Hughes Point and Scott Point. This work necessitated the erection of a 30-foot station back of Seul Choix Point, a 16-foot station on Hughes Point, and a 26-foot station on Scott Point. In preparation for the extension of the triangulation eastward a 35-foot station was erected on Point Patterson and one 45 feet high on Biddle Point.

Owing to the exposed location of its work, orders were issued to this party on October 6 to suspend operations on the north shore and take up sweeping work along the sailing course between Beaver Harbor and Grays Reef Passage. Continuous stormy weather prevented the transfer until October 13. The party was stationed at St. James about two weeks, during which time a system of triangulation was established for control of surveys in this region, but continued rough weather prevented sweeping work. On October 29 the general surveys were suspended for the season and the steamer and party went to St. Ignace and from that port assisted in the remeasurement of the Mackinaw base line. They left for Detroit on November 7, arriving there on the following day.

The steamer *Search* with party left Detroit on May 28, 1918, to resume the surveys along the north shore of Lake Michigan. With St. Ignace for headquarters, the party has been employed up to the end of the year in continuing the triangulation for its surveys eastward from the work of the previous season. The stations at Scott Point and Point Patterson have been recentered, the 45-foot station on Biddle Point, which was blown down during the winter, was rebuilt and new stations were erected on Naubinway Island, in the bay west of Naubinway, on Cranberry Point, and on High Island. Stations Garden, South Garden, Whiskey, Trout, and Gull of the 1903–4 survey were re-covered and rereferenced.

In addition to the triangulation work, a topographic survey was made of the shore for a distance of about 6 miles northerly from Point Patterson.

Primary triangulation westerly from Straits of Mackinac.—A system of primary triangulation to connect from the Straits of Mackinac westerly to the chain of triangulation along the west side of Lake Michigan, which is described in the 1917 report of the Chief of Engineers, page 3739, was being established at the beginning of the year. The field work was in charge of Junior Engineer H. F. Johnson. Five stations had been prepared, and the observing party was ready to begin angle reading.

Stations Maple Hill, Mackinac Island, Pte aux Chenes, Manitou Paymen, and West Base were occupied in the order named. Observations at the latter station were completed on October 17. The station party, during this time repaired old stations or completed new ones at Crane Island, Hog Island, Beaver Island, Goodhart, and Charlevoix upon sites previously selected or established. By this time severe weather had set in and it was considered inadvisable to continue the work on the outlying islands at this last date. Accordingly, field work was suspended. The balance of the month was spent in bringing in the heliotropers from the distant stations, laying up the launch, and packing the equipment. The party was disbanded on October 31.

The Mackinaw City base line of the primary triangulation system was remeasured during the period from October 30 to November 7, 1917, by the combined forces of the two hydrographic parties which had been operating during the season on Lakes Michigan and Superior. A 50-meter invar tape belonging to the Lake Survey and two 50-meter invar tapes borrowed from the Coast and Geodetic Survey were used, a complete measurement being made with each of the three tapes. Following the completion of the measurements the tapes were sent to the Bureau of Standards, where they have been restandardized. Preliminary reductions indicate that the new measurements will give an exceedingly accurate value for the length of the Mackinaw base.

Mr. Johnson left Detroit on June 7, 1918, to resume field operations. After making minor repairs to the launch *Inspector*, which had been stored at Cheboygan during the winter, he organized a party and went into camp on Crane Island on June 15. The time between then and the end of the year was spent in placing heliotropers at the adjacent stations and in reading angles at station Crane Island.

Survey of Lake of the Woods.—A field party in charge of Junior Engineer D. F. Jennings, which was stationed at Warroad, Minn., at the beginning of the year, was then engaged in sounding the Lake of the Woods north and west of Garden Island. On July 5 the party moved into camp on Oak Island, and operations were then transferred to Northwest Angle Inlet. Beginning at the extreme end of the inlet the channel along the international boundary and all channels on the American side of the boundary were sounded in detail. Upon their completion the survey was extended into the lake, covering the area from the westerly shore to longitude 94° 46′ between latitudes 49° 14′ and 49° 19′, and from longitude 94° 53′ to 94° 51′ between latitudes 49° 11′ and 49° 14′. A total area of 64 square miles was sounded after July 1. Locations were determined in the inlet from the positions of boundary monuments and in the open lake from the triangulation established by the International Boundary Commission. Numerous rock shoals were found in the island channels and in the inlet, and five important shoals were located in the lake, three southeasterly of Oak Island and two between Oak Island and Sugar Point. On August 29 the party returned to Warroad and from there resumed the sweeping over the shoal area lying north and west of Gull Rock in the vicinity of Rocky Point. A total area of 10¼ square miles between latitudes 48° 59′ and 49° 04′ and longitudes 95° 04′ and 95° 08′ was covered, revealing the existence of three important shoals of ragged ledge formation with least depths of 5¾, 6¼, and 6½ feet, respectively. Sweeping work was completed on September 20. Field work was then suspended and after laying up the launch and storing the equipment the party was disbanded. The technical assistants departed for Niagara Falls, N. Y., on September 24, and Mr. Jennings followed on September 26, these employees being transferred to survey work under direction of the division engineer, Lakes Division, in connection with "Investigations of water diversion from the Great Lakes and Niagara River."

Field work on the Lake of the Woods was not resumed in 1918 prior to July 1.

Saginaw River.—In June, 1918, Mr. A. J. Swift, chief draftsman, made a thorough reconnaissance of the Saginaw River from its mouth to Saginaw, Mich., and obtained data of new shipyards and other changes since the recent survey of that river. The additional information will be added to the new chart of Saginaw River, which, on July 1, was nearly ready for publication.

Precise levels.—The precise level line from Algonac to St. Clair Flats, Mich., which was in progress at the beginning of the year, was finished early in July, 1917. This work was done by a party from the office of the Coast and Geodetic Survey upon request of the Lake Survey, and the two offices shared the expense. The geodetic leveling in the Great Lakes region is now considered complete.

INVESTIGATION OF LAKE LEVELS.

Water levels.—The stage of water in the lakes and in the interlake and outflow rivers has been recorded as heretofore by the regular series of self-registering gauges.

Including the St. Clair Flats gauge, which is maintained by the United States engineer office, Detroit, Mich., during the season of navigation and by this office during the winter, the Lake Survey now maintains 10 self-registering gauges and 1 staff gauge, as follows:

1. Lake Ontario, at Cape Vincent.
2. Lake Erie, at Buffalo.
3. Lake Erie, at Cleveland.
4. Detroit River, at Fort Wayne.
5. Lake St. Clair, at Windmill Point (staff).
6. St. Clair River, at head of St. Clair Flats Canal.
7. St. Clair River, at Port Huron.
8. Lake Huron, at Harbor Beach.
9. Straits of Mackinac, at Mackinaw City.
10. Lake Michigan, at Milwaukee.
11. Lake Superior, at Marquette.

The Lake Survey also operated an automatic gauge at Toledo Harbor Lighthouse during a portion of the past year, while field work was in progress at the west end of Lake Erie.

In addition, this office received records of the self-registering gauges maintained by the district offices, as follows: Detroit River at Amherstburg, Lake Michigan at Chicago, St. Marys River below the locks, and St. Marys River above the locks, and records of staff gauge readings on Lake Ontario at Oswego and on Lake Superior at Houghton and Duluth.

The following table shows, for each of the Great Lakes, the monthly mean levels for the fiscal year, as determined from records of the standard gauges:

Monthly means of water level for stations named, expressed in feet above mean sea level.

[Adjusted levels of 1903.]

	1917					
	July.	August.	September.	October.	November.	December.
Marquette	602.60	602.69	602.72	602.63	602.44	602.14
Milwaukee	581.97	581.91	581.71	581.39	581.20	580.77
Harbor Beach	581.88	581.88	581.59	581.29	581.16	580.84
Cleveland	573.85	573.57	573.27	572.84	572.98	572.56
Oswego	247.46	247.35	246.93	246.68	246.69	246.45

Monthly means of water level for stations named, etc.—Continued.

	1918					
	January.	February.	March.	April.	May.	June.
Marquette	601.91	601.65	601.52	601.44	601.68	602.11
Milwaukee	580.82	580.84	581.13	581.50	581.74	581.98
Harbor Beach	580.72	580.80	581.03	581.32	581.58	581.92
Cleveland	571.89	571.65	572.25	572.26	572.15	572.54
Oswego	246.07	245.98	246.61	247.17	247.13	247.01

The hydrograph showing the monthly mean water levels of all the Great Lakes from January, 1860, to June, 1918, inclusive, was brought up to date.

During the year there has been issued a series of notices to navigation interests giving the monthly mean stages for all the lakes during the preceding month, comparing these stages with corresponding ones for critical years, and predicting the stages to be expected for the following month. These notices have been accepted as authoritative and of great usefulness.

Hydraulics.—No hydraulic measurements have been made during the past year.

The hydraulic work on the Great Lakes is considered complete for the present. The flow in the St. Marys River is undergoing change due to construction of remedial and regulating works at the head of the Rapids, and will probably soon be under complete control. The natural flow in the other rivers has been measured sufficiently to determine with precision the laws of discharge under present conditions of regimen. Any change in the regimen from either natural or artificial causes will, of course, require additional measurements, but none are foreseen at present. The latest discharge equations for the several connecting and outflow rivers are given on page 1928 of the Report of the Chief of Engineers for 1917.

Miscellaneous.—The compilation and analysis of rainfall and run-off data for the Great Lakes and their respective drainage basins, and the determination of supply factors for the waters of the lakes, have been continued whenever time permitted, and good progress was made during the year.

The taking of air and water temperatures was continued during the field seasons by the steamer parties engaged on hydrographic work.

The table giving a summary of discharges from the several lakes, determined by the formulas noted above, corresponding to the mean elevations for the last 58 years, was revised to include the calendar year 1917, and is printed on page 1964.

PLANT.

The floating plant of the survey consists of five small steamers, three of which are equipped with launches for use on sweeping operations. None of the steamers was originally built for survey work, but by alterations and improvements from time to time all have been made fairly serviceable. As usual with old floating plant, the annual cost of repairs is a considerable item of expense.

The steamer *Surveyor* developed a bad leak during the field season and was docked and calked at Toledo in September, 1917. The steamer *Col. J. L. Lusk* was docked in December for minor repairs to hull. The *Search* was put on the ways for inspection and such repairs as were needed. It was found necessary to replace 14 plates and reinforce several frames in order to make this vessel seaworthy. The work was done during the early winter. The boiler of the steamer *Surveyor* was repaired, the stern of launch *No. 5* was rebuilt, and minor repairs to other floating plant were made while fitting out for the present season.

CONTRACTS IN FORCE.

Contractor: The Detroit Legal News Co.

Character and amount of work: Printing of Lake Survey Bulletin No. 27 and seven supplements.

Unit prices: Bulletin, $1,837; and supplements $27.50 to $118.80 each for sizes from 4 pages to 22 pages.

Date of approval: March 2, 1918.

Date fixed for beginning work: As ordered.

Date fixed for completing work: Bulletin, 35 days; supplements, 5 days each.

Percentage of completion at end of fiscal year: 88.

COMMERCIAL STATISTICS.

Practically the entire commerce of the Great Lakes is affected by the operations of the Lake Survey and dependent upon the publication and constant revision of charts and bulletins. At present the freight movement on the lakes is well over 100,000,000 tons annually.

APPROPRIATIONS.

The aggregate amount of appropriations for survey of northern and northwestern lakes prior to the adoption of the present project is $3,977,379. (See list, p. 3390, Annual Report for 1914.)

Appropriations under the existing project are as follows:

Mar. 4, 1907	$75,000.00
May 27, 1908	125,000.00
Mar. 4, 1909	125,000.00
June 25, 1910	125,000.00
Mar. 4, 1911	125,000.00
Aug. 24, 1912	125,000.00
June 23, 1913	125,000.00
Aug. 1, 1914	125,000.00
Mar. 3, 1915	125,000.00
July 1, 1916	125,000.00
June 12, 1917	125,000.00
July 1, 1918	125,000.00
Total	1,450,000.00
Total of appropriations under all projects	5,427,379.00
Amounts carried to surplus fund of the Treasury	3,176.83
Net total of appropriations	5,424,202.17

INVESTIGATION OF WATER DIVERSION FROM THE GREAT LAKES AND NIAGARA RIVER.

REPORT OF COL. J. G. WARREN, CORPS OF ENGINEERS.

The following report is submitted on operations during the fiscal year ended June 30, 1918, upon the investigation of water diversion from the Great Lakes and Niagara River:

This investigation, the duty of making which was assigned to the division engineer, Lakes Division, by letter from the Chief of Engineers dated July 20, 1917, was directed by Congress in Public Resolution No. 8, Sixty-fifth Congress, as follows:

> *Resolved by the Senate and House of Representatives of the United States of America in Congress Assembled,* That public resolution numbered forty-five of the Sixty-fourth Congress, approved January nineteenth, nineteen hundred and seventeen, entitled "Joint Resolution authorizing the Secretary of War to issue temporary permits for additional diversions of water from the Niagara River", is continued in full force and effect, and under the same conditions, restrictions, and limitations, until July first, nineteen hundred and eighteen; *Provided,* That the Secretary of War is hereby authorized and directed to make a comprehensive and thorough investigation, including all necessary surveys and maps, of the entire subject of water diversion from the Great Lakes and the Niagara River, including navigation, sanitary and power purposes, and the preservation of the scenic beauty of Niagara Falls and the rapids of Niagara River, and to report to Congress thereon at the earliest practicable date. To carry out the provisions of this proviso, there is hereby appropriated out of any money in the Treasury not otherwise appropriated, the sum of $25,000.

The scope of the investigation now in progress is indicated in detail by the following outline of subjects and topics:

(*a*) Diversions for navigation purposes:
  1. St. Marys Falls Canals.
  2. Chicago Sanitary Canal and Illinois and Michigan Canal.
  3. Welland Canal.
  4. New York State Barge Canal.
  5. St. Lawrence River Canals.
  6. Proposed canals, Lake Erie to Lake Ontario, American side; and Lake Ontario to Hudson River.
  7. Present and proposed canals which divert water from tributaries of the Great Lakes.

(*b*) Diversions for sanitary purposes:
  1. Chicago Sanitary Canal.
  2. Black River Canal.
  3. Proposed Erie and Ontario Sanitary Canal.
  4. Diversions of cities.

(*c*) Diversions for power purposes:
  1. St. Marys Falls Canals.
  2. Chicago Sanitary Canal.
  3. Welland Canal.
  4. New York State Barge Canal.
  5. Canadian and United States power plants at Niagara Falls.
  6. St. Lawrence River Navigation Canals.
  7. Massena Canal.
  8. Proposed Erie and Ontario Sanitary Canal.

(*d*) Preservation of scenic beauty of Niagara Falls and of the Rapids of Niagara River:
  1. The problem.
  2. Remedial works.
  3. Diversions around the Falls of Niagara.
  4. Diversions around the Whirlpool and Lower Rapids.

(*e*) Propositions for utilizing diversions with greater economy:
  1. General statement.
  2. Present Niagara Falls plants.
  3. Plant using entire diversion and total head.
  4. Several plants dividing diversion, but using full head.
  5. Several plants dividing diversions and dividing head.
  6. Two plants each using full diversion, but dividing head.
  7. Power development combined with ship canal.
  8. Erie and Ontario Sanitary Canal.

(*f*) Effects of diversions upon lake levels:
  1. Present effects.
  2. Proposed effects.
  3. Remedial works.

(*g*) Economic results of diversions:
  1. Effect upon navigation.
  2. Effect upon riparian interests.
  3. Value to Chicago of its diversion.
  4. Value to public of effect on navigation.
  5. Value to public of effect on power production.

(*h*) International and interstate matters involved:
  1. Statement of the case.
  2. Treaty provisions.
  3. Interests of various States.

(*i*) Recommendations:
  1. Treaty provisions.
  2. Use of diversions.
  3. Provisions of allotments of diversion privileges.

The progress made under this program, which is the project, and the purpose of each phase of the work done is as stated below. Operations were confined to office studies, conferences, and correspondence, until the middle of September, when subproject for the expenditure of the available funds by the district engineer, Buffalo (N. Y.) district, who is also the division engineer Lakes Division, had been approved by the Chief of Engineers, and authorities had been secured and plans perfected for undertaking the field work which was essential to a comprehensive consideration of that portion of the investigation pertaining to Niagara Falls and Niagara River. The records bearing on the subject which were contained in the files of the United States Lake Survey office were examined, and conference was had with the district engineer in regard to laying out the work and getting it under way; and, subsequently, as to its prosecution, in all of which his assistance has been valuable. The greater part of the personnel of the field force was drawn from the trained assistants of the Lake Survey. Mr. W. S. Richmond, assistant engineer, was placed in immediate charge of the operations in the field, with station at Niagara Falls, N. Y. He has carried on the important work assigned to him with ability and untiring energy. During the winter both he and his assistants exposed themselves constantly to the severe weather conditions prevailing, and have spared no effort in the proper prosecution of their duties.

Following the organization of the field force, its equipment, the securing of civil and military permits to enter private property, and the carefully guarded grounds and plants along both sides of Niagara River, the actual field work commenced September 20, 1917.

The most difficult portion of the field work was the survey of the rapids of Niagara River just above the Horseshoe Falls. Its purpose was to provide data on the depth of water, its direction and velocity of flow, throughout a reach of rapids extending about one-half mile upstream from the Horseshoe Falls; also to obtain actual elevation above standard datum of the water surface at various points. These data were essential for an intelligent study of:

First. The preservation of the Horseshoe Falls from destructive erosion and of increasing its beauty by a better distribution of water along its crest.

Second. In estimating the total quantity of water which may be safely diverted from the Niagara River above the falls.

This part of the work is complete, the notes have been reduced and platted and maps have been prepared which are being used in the studies of proposed remedial works.

A survey was made of the crest line of Horseshoe Falls. The resulting map is important as showing the erosion of the falls since 1906—the date of the last preceding survey—is essential in designing remedial works, and of great aid in considering permissible diversion of water around the falls.

A topographic survey was made of about 12 miles of territory lying partly within the eastern city limits of Niagara Falls, N. Y., but mainly east of those limits and within the triangular area bounded by the Niagara River and the Old Military Road which runs directly between the villages of La Salle and Lewiston. The main features of the terrain were located and elevations obtained for the development of 2-foot contours. Surveys of other portions of this triangular area previously surveyed and mapped by the Lake Survey, were added to and corrected. The survey was made for use in determining the possibility of an open canal designed to conduct water from some point on the Niagara River well above the falls to some point well below the main portion of the lower rapids. This survey was extended to the water's edge in the Lower Gorge of the Niagara River from Devils Hole to Fish Creek near the Lewiston escarpment, being in considerable detail on the steep slopes, for use in considering possible power-house locations.

In connection with the survey outlined above, exploration was made to determine the depth to rock of the overlying soil throughout the area in question; this for use in projecting possible canal routes and in the design and estimate of cost of proposed hydraulic tunnels.

These surveys were completed during the unusually severe winter. The field notes have since been reduced and platted and the resulting maps are now nearly complete.

Eight self-registering water gauges were installed along the river and maintained in operation for about two months in the autumn of 1917. The locations were all between Chippawa, Ontario, and Lewiston, N. Y., and were, in all but one case, at positions where such gauges had been maintained by the Lake Survey in previous years. The continuous graphic records of water-surface elevations obtained have been used:

First. In comparison with earlier records to disclose what changes in regimen of the river have been wrought by erosion of the Horseshoe Falls crest line or by increased diversions of water for power development.

Second. For strengthening and expanding the data on which predictions of future effects of erosion and diversions must in part be based.

Third. For computing volumes of discharge of the river and rapids at the times of measuring depths and current velocities, and taking photographs.

Fourth. In preparing a water-surface profile of Whirlpool Rapids and Lower Rapids.

In this connection accurate leveling was required. A duplicate line of levels 6¼ miles long was run to establish bench marks and gauge points in the gorge, necessary in obtaining a water-surface profile of the Whirlpool Rapids and Lower Rapids.

Sufficient water-surface readings were taken along the United States side of the Whirlpool Rapids and the Lower Rapids to provide data for the construction of accurate profiles of the water surface at high, medium, and low stage. This information is essential in designing a power development discharging into the rapids, and in the study of backwater effects which would be caused by a dam in either rapids.

Stream velocities of flow were measured roughly at several cross sections of the Whirlpool Rapids and the Lower Rapids. The results have been combined with the known volumes of discharge obtaining when the velocity observations were taken, the known widths of river channel, and the known shape of river cross section at the cantilever bridge, in making a fair estimate of the depths in various reaches of the rapids. It is necessary to know something of these depths in order to judge the ice-discharging capacity of the rapids. They have been used to compute the probable backwater rise which would result from building a dam in the gorge, several different heights of dam having been considered.

A large number of photographs were taken illustrating the changed appearance of the falls and rapids since the year 1906, when an investigation by the War Department was in progress, and the change in appearance at present under conditions of high, normal, and low stages of water. Some photographs were taken to show ice conditions and effects, and a few to illustrate methods of field work.

Although the field work was considerably delayed by unfavorable weather conditions, and difficulty in securing proper assistants because of the war, it was completed in February, 1918, except for a further physical examination of the Welland Canals, old and new, and a reconnaissance of the route of the proposed Erie & Ontario Sanitary Canal, soon to be made.

Reductions of data obtained in the field are now complete. The two sheets covering the area to be mapped are nearly finished. Gauge records and level notes have been reduced. The crest line survey of the falls has been platted, as has also the survey of the rapids above Horseshoe Falls. Various reports which have been submitted covering proposed water-power development have been given consideration, and the plans and estimates of the propositions involved have been studied to some extent. Ideas and opinions of experienced engineers on certain important matters involved have been obtained informally. Important data pertaining to diversions of water from Lake Michigan at Chicago have been secured through the cooperation of the district engineer at Chicago, Ill. A study is being made of various plans for regulating works for the maintenance of lake levels, and of remedial works for the prevention of further erosion of the crest of the Horseshoe Fall, together with designs and estimates of cost. Profiles of water surface in the gorge have been prepared. Velocities and depths in the Whirlpool and Lower Rapids have been derived; and backwater effects to be expected from the construction of dams of various heights at Fosters Flats have been computed. A study has been made of the proposed La Salle to Lewiston Ship Canal, and revised estimates prepared. Some checking and revising remain to be done in connection with several of the items noted above. Studies are being made of various propositions for developing power with water diverted from Niagara River, including preparation of outline plans and estimates of cost and time of construction. Other office work still to be prepared includes: Construction of profiles of sites for power stations; the procuring of further data on diversions at Sault Ste. Marie, Port Huron, Welland Canal, and St. Lawrence Canals; further study of the effect of diversions at Niagara Falls on the beauty and ice-discharging capacity of the falls and rapids, and preparation of the final report.

On March 2, 1918, there was submitted an interim report upon investigation of water diversion from Great Lakes and Niagara River. This report was made in compliance with instructions from the Chief of Engineers and contains statement of operations up to that time, of conclusions then drawn, and recommendations as to possibility of the immediate development of additional power from treaty water at Niagara Falls. Further results of the investigation have not led to any modifications of the conclusions and recommendations contained in that report, but it is to be noted that the final figures are not yet available.

In paragraph 23 of the interim report a brief description was given of each of nine propositions for power development at Niagara Falls which had been submitted by various persons and corporations. These plans were submitted by (1) the Hydraulic Power Co., (2) the Niagara Falls Power Co., (3) Hugh L. Cooper & Co., (4) the Empire Power Corporation, (5) the Niagara County Irrigation and Water Supply Co., (6) the Erie & Ontario Sanitary Canal Co., (7) Kennard Thompson, and (9) the Niagara Gorge Power Co. The eighth was a scheme for developing power at the Terrapin Point end of Horseshoe Falls, recommended by a senate water power committee of the New York State Assembly. These propositions had been considered and studied to some extent, and very careful study had been given to the three which seemed to promise the most immediate and satisfactory development of additional power from treaty water.

The three plans considered in detail as involving possibilities of early power production were presented by the Hydraulic Power Co., the Niagara Falls Power Co., and the Empire Power Corporation. A check and comparison of estimates was made in the case of these three projects. The plan of the Hydraulic Power Co. was recommended as affording the best solution of the problem under existing conditions.

Work on the construction necessary to the installation of two hydroelectric generating units of approximately 33,000 horsepower each, was commenced by the Hydraulic Power Co. at Niagara Falls about May 20, 1918, and was well under way at the end of the fiscal year. This development involves dredging a channel 300 feet wide and about 3,000 feet long from deep water in Niagara River to the head of the hydraulic canal, deepening the canal, deepening and widening the basin, and building a new power house adjacent to the south end of present station No. 3, together with the necessary fore bay, penstocks, and other appurtenances. The development in progress was designated in Exhibit B accompanying the interim report of March 2, 1918, as "Proposition H. P.–C." General supervision of these operations was assigned to me in letter dated May 22, 1918. Information in regard to costs and speed on this work furnishes a valuable guide in estimating future proposed work at the same locality. The progress of these operations is satisfactory, and is fairly up to schedule.

A special investigation and report upon the water-power situation along the western end of the New York State Barge Canal was made in June, 1918, at the request of the Chief of Engineers.

A portion of the office force was transferred to the United States Lake Survey office, Detroit, Mich., on January 11, 1918. Assistant Engineer W. S. Richmond and the remainder of the office force were transferred to Detroit March 29, 1918, and most of the office work has been conducted at the Lake Survey office since that time, in order that the facilities there available could be utilized to the greatest extent.

The status of the office work at the close of the fiscal year is indicated as follows:

Item.	Percentage completed June 30.
(a) Gauge records (reduction, study, and use)	87
(b) Gorge profile (computations and plotting)	87
(c) Survey in rapids above Horseshoe Falls (plotting and computations)	82
(d) Velocities in Whirlpool and Lower Rapids (reductions and determinations of river depths)	75
(e) Study of Niagara Ship Canal and revision of estimates	80
(f) Power proposition studies, outline designs, estimates	65
(g) Topographic map, vicinity of Niagara Falls (computations, plotting, transferring)	85
(h) Map and profiles of sites for power stations	90
(i) Preparation crest line map of Horseshoe Falls with reproduction of old lines, for comparison	95
(j) The procuring of data on diversions other than at Chicago or Niagara Falls	40
(k) Reduction of level notes	100
(l) Study and design of Hoseshoe Falls remedial works with estimate of cost	15
(m) Computation of backwater in Gorge	80
(n) Consideration of remedial works for lake overflow rivers	75
(o) Digestion and study of Chicago Drainage Canal data	80
(p) Study of effect of diversions on scenic beauty, and ice discharging capacity of falls and rapids	25
(q) Study of power development plans presented and check of estimates	50
(r) Consultations with experts	40
(s) Preparation of report	13

The final report, now in preparation, will contain a complete and sufficiently detailed statement of operations, as well as a full treatment of the topics listed in paragraph 3. The work has taken more time than anticipated, but if it is to be of real value in the final determination of the many important questions involved, all essential facts must be ascertained and clearly stated. The report is being pressed with all practicable speed, but the great detail involved and the necessity for the revision of existing data which develops as the work progresses makes it impossible to predict with any degree of accuracy the date of its completion.

Financial statement.

Amount appropriated or allotted this fiscal year: Allotment Sept. 18, 1917	$25,000.00
Amount expended during the fiscal year ending June 30, 1918	11,757.27
Balance unexpended July 1, 1918	13,242.73
Outstanding liabilities at the end of the fiscal year	1,047.58
Balance available	11,031.68

IMPROVEMENT OF YELLOWSTONE NATIONAL PARK, INCLUDING THE CONSTRUCTION, REPAIR, AND MAINTENANCE OF ROADS AND BRIDGES.

REPORT OF MAJ. G. E. VERRILL, ENGINEERS, U. S. R.

FORCE AND PLANT.

The office and storehouse forces consisted of from two to four civilian engineer assistants, one chief clerk, from four to five clerks in the office, and one storekeeper, one assistant storekeeper, and one to two clerks in the storehouse.

All work done during the fiscal year was by hired labor. The force employed varied. During the height of the working season of 1917, which extended from about June 1 to October 30, about 125 to 250 men and 150 to 200 horses were employed. During the remainder of the year there was little field work in progress, and operations were mainly confined to repair of plant and equipment and to preparations for the working season, the force employed varying from 20 to 40 men and 8 to 18 horses, all of the latter being owned by the United States. During the fiscal year labor of all kinds, both skilled and unskilled, was scarce and hard to secure, due in large part to the war but in part to the development of the surrounding country, which constantly requires more and more labor. The quality of the labor has also, as a rule, been very poor. The scarcity and poor quality of labor has greatly increased the difficulties of the work, as well as the cost.

The plant employed consisted of that previously purchased and on hand, and of the following additional principal items purchased during the fiscal year:

Six 3½-cubic yard steel dump trailers.
One 75 horsepower caterpillar tractor.
Two sets Whalen concrete culvert forms.
One 500-gallon gasoline service equipment.
One 5-passenger automobile for inspetcion.
Two 2-ton express trucks.
One gasoline storage tank, 12,000 gallons capacity.

WORK ACCOMPLISHED.

BELT LINE.

General road repairs.—As a result of the extremely heavy snows of the winter of 1916–17, some of the roads were not open at the beginning of the fiscal year, and many of those that had been opened were in poor condition. The road through Dunraven Pass was opened on July 9 and the first automobile of the season went through on the following day. The road on the south side of Mount Washburn from the canyon to the summit was opened on July 8, but on the north side from the summit to Tower Falls the road was not open until July 16.

Five flying grader squadrons, as the early repair crews are called, took the field early in July but were greatly delayed by the very unusual weather conditions, and it was late in the season before they had covered the entire belt line. The work done by these crews was unusually heavy, due not only to the results of the severe winter and heavy snow, but also to the increased use of automobiles and the demand for better roads than were formerly necessary with horse-drawn vehicles. The work done by these crews consisted chiefly in reshaping and recrowning the roads, filling chuckholes, building up to grade fills which had sunken, repairing bridge approaches, repairing retaining and guard walls, minor repairs to bridges and culverts, cleaning out culverts and ditches, and removing fallen rock from the roads.

The spring of 1918 was considerably earlier than that of the previous year, the weather during June being unusually warm, so that it was possible for the road crews to take the field much earlier than during the previous year. One small crew took the field on May 26 to repair the sprinkler system, and by the close of the first week in June six crews were in the field. At the end of the fiscal year the entire belt line, including the crossroad from Norris to the canyon, except a small portion in Dunraven Pass, where there was much snow, had been covered at least once and in many places two or three times by the crews. The work done by the first crew over the road consisted almost entirely of reshaping and crowning the road and grading the ditches by the use of horse-drawn grading machines, leaving the various other repairs, such as those to bridges and culverts, retaining and guard walls, etc., to a second crew. The first crew was provided with four grading machines, each drawn by four horses, and it was consequently able to make rapid progress. The second crew made the necessary repairs to bridges, culverts, retaining and guard walls, ditches, and the general drainage system: removed fallen rock and slides which were too large to be handled by the grader crew; and was also provided with two grading machines to reshape and recrown the roads in places where they had been cut up after the passage of the first crew or where they were too wet or frozen too hard when that crew passed, to allow of their being properly graded. The progress of the second crew was necessarily much slower than that of the first. On account of unusually heavy rains during a portion of June, the second or general repair crew, as distinguished from the first or grader crew, was much delayed.

On June 3 a single crew, doing both grading and general repair work, was started on the road from Fort Yellowstone toward Tower Falls and at the close of the fiscal year had reached a point a short distance beyond Tower Falls, having, in addition to the usual road work, removed a large amount of fallen rock at the Overhanging Cliffs, where the road had been completely blocked to all traffic except pedestrians.

Sprinkling and dragging.—During the spring of 1918 there was so much rain that little sprinkling was necessary up to the close of the fiscal year, only three sprinklers having been put at work; and, of these, two were used in connection with the work of the road crews to dampen the material so that it would properly pack in the ruts and holes after the graders had been over the road.

Patrol maintenance.—During the season of 1917 two patrols of one man and team each were stationed at Beaver Lake, on the Fort Yellowstone-Norris road, and at the canyon, respectively, to fill chuck holes and make minor repairs. It was intended during the season of 1918 to greatly extend the patrol system, stationing small crews of from two to three men and several teams at various points along the entire belt line and approaches, so that the entire road system would be patrolled at all times, the duties of the patrols being to make all minor repairs and also to attend to the sprinkling. It is believed that this is the only practicable system by which the existing roads can be kept in fairly good condition. At the close of the fiscal year the patrols had not been actually sent out, as the larger, general repairs crews had not progressed quite far enough with their work to permit of their being split into the smaller patrol crews.

Firehole River realignment.—This realignment, to replace several miles of the road between Madison Junction and the Firehole Cascades, was begun in June, 1915. At the beginning of the fiscal year 4,700 feet had been completed, and partial work had been done on 300 feet additional, leaving approximately 2,700 feet of work not begun. Work was resumed July 1, 1917, and continued until October 23, when it was suspended on account of unfavorable weather. Work had not been resumed this spring before the close of the fiscal year, at which time 5,700 feet had been completed; another 1,000 feet was about 50 per cent completed, and the remaining 1,000 feet had not been begun.

Oil macadam work.—In the latter part of July, 1917, work was begun preparatory to finishing with oil macadam a section of the Fork Yellowstone-Norris road. A rock-crusher plant was set up about 8 miles from Norris, and widening and subgrading the road was begun at a point about 2 miles from Norris. A stretch of road extending from this point 2,050 feet northerly was prepared for the oil surface. It was then decided to start work at a point nearer the crusher and work southerly to meet the first piece. Accordingly, another stretch 1,050 feet long, extending southerly from a point 7½ miles from Norris, was also prepared for oiling. By this time—October 5—the weather was so unfavorable that it was decided to defer the actual oiling until spring. In May, 1918, nearly 19,000 gallons of oil were purchased for this work and stored at Gardiner. Although preparations were made to begin the oiling not later than the middle of June, there was so much rain that it was not practicable to begin the work until June 28. At the close of the year the short stretch, 1,050 feet long and 14 feet wide, was completed. The other stretch, 2,050 feet long and 16 feet wide, only lacked the oiled surface.

Graveling.—Two thousand five hundred linear feet of road from Fort Yellowstone to Norris, in the vicinity of the Silver Gate, were graveled during the fall of 1917, for an average width of 13 feet, with a layer of gravel 5 inches deep; and various short stretches of the belt line, where the road was in particularly bad condition, were graveled at various times during the fiscal year.

Platforms and board walks.—Ten landing platforms at various points of interest, originally built to accommodate passengers alighting from horse-drawn vehicles, were lowered to accommodate automobile passengers. In the Norris Geyser Basin 722 linear feet of new board walk were built to replace an equal amount of old walk, and 246 linear feet of old walk were repaired; at the Thumb 185 linear feet of board walk was repaired; and at Tower Falls a landing platform and stairs were constructed.

Bridges and culverts.—During the year the following reinforced-concrete culverts were installed, in most cases to replace existing wooden bridges:

Width.	Height.		Length.	Location.	Built.
Feet.	*Ft.*	*in.*	*Feet.*		
4	2	3	42	9.2 miles from Canyon Junction, Dunraven Pass road	1917
4	2	3	42	8.9 miles from Canyon Junction, Dunraven Pass road	1917
4	2	3	54	8.8 miles from Canyon Junction, Dunraven Pass road	1917
4	1	7	54	8.4 miles from Canyon Junction, Dunraven Pass road	1917
4	1	7	48	8.35 miles from Canyon Junction, Dunraven Pass road	1917
4	2	3	42	8.3 miles from Canyon Junction, Dunraven Pass road	1917
4	2	3	30	7.8 miles from Canyon Junction, Dunraven Pass road	1917
4	2	3	42	7.7 miles from Canyon Junction, Dunraven Pass road	1917
4	2	3	24	5.36 miles from Canyon Junction, Dunraven Pass road	1917
4	1	7	18	5.3 miles from Canyon Junction, Dunraven Pass road	1917
4	2	3	30	4.9 miles from Canyon Junction, Dunraven Pass road	1917
4	2	3	42	4.55 miles from Canyon Junction, Dunraven Pass road	1917
4	2	3	42	3.6 miles from Canyon Junction, Dunraven Pass road [1]	1917
4	2	3	24	Opposite Lake Soldier station	1917
4	2	3	30	Near lake, opposite fish hatchery	1917
4	2	3	84	1.05 miles south of Lake Hotel	1917
4	2	3	84	0.95 mile south of Lake Hotel	1917
6	4	0	72	Geode Creek crossing, Fort Yellowstone-Tower Falls road	1917
4	2	3	30	Yancey Creek, 1.5 miles west of Tower Falls	1917
6	4	0	50	1.75 miles north of Thumb	1917
6	2	3	18	Swan Lake Flats, about 5 miles from Fort Yellowstone, Fort Yellowstone—Norris road.[2]	1918

[1] This culvert was washed out in spring of 1918 and replaced by wooden bridge.
[2] Double culvert, each opening.

In addition to the above-named concrete culverts, 18 corrugated galvanized-iron culverts, varying in diameter from 12 to 24 inches, with an average length of 30 feet, were installed; one wooden truss bridge of 40-foot span, over the Firehole River just beyond the upper basin, was redecked with plank; one log bridge of 14-foot span at the upper basin was reconstructed; and 79 linear feet of small log bridges were redecked. In the spring of 1918 various minor repairs were made to bridges and culverts, and one more or less temporary wooden bridge of about 45-foot span was constructed to replace a fill, which had washed away from over a culvert constructed during the previous season, at a point 3.6 miles from the Canyon Junction.

Guard rails and retaining walls.—Minor repairs were made to guard rails and retaining walls at various points. In the spring of 1918 several rather serious washouts, which involved the retaining walls on the Norris-Canyon road at the Virginia Cascades, were repaired and the walls reconstructed.

NORTH APPROACH.

During the season of 1917 general repairs were made to the north aproach road, extending from Fort Yellowstone, through the Gardiner River Canyon, to Gardiner, Mont.; and the first 3½ miles of this road from Fort Yellowstone were sprinkled.

The slide from the easterly slope of Sepulchre Mountain, which for several years has been giving increasing trouble, threatened to close the north approach road. It was kept open throughout the summer of 1917 by a small crew, and at the end of October the steam shovel was put at work cutting off the toe of the slide and throwing the material into the river. This work was continued until January 16, 1918, two cuts having been made across the toe of the slide and the road left about 25 feet wide and in fair condition. It was thought likely that the development of the slide might cause cracks to extend back into Slide Lake on the mountain side and that this might produce the sudden movement of a large amount of material. To minimize this danger, a channel was cut so as to lower the lake several feet, taking the water around the slide in a flume; but, owing to quicksand, it was found impracticable, without large expense, to completely drain the lake. During the winter the road was kept open without difficulty, although a constant movement of the slide took place. Early in the spring, work was resumed with a small force of men to keep the road open. It was considered, however, practically certain that it would be impossible to maintain this road except at a very great expense, and that it was likely to be suddenly destroyed at any time. Consequently work was begun on the reconstruction of the old freight road described in the following paragraph. Early in June a sudden spell of hot weather, followed by a large amount of precipitation, caused an especially high freshet in the Gardiner River, which resulted in the complete destruction of a large portion of the road through the canyon in the vicinity of the slide and necessitated the abandonment of this road as a means of communication between Fort Yellowstone and Gardiner.

Reconstruction of old hill or freight road.—The original road between Fort Yellowstone and Gardiner was the so-called Old Freight Road. This road was in use for many years before a road was located in the Gardiner Canyon. After the latter was constructed the old road was, for the most part, abandoned, and it was impassable for wheeled vehicles at the beginning of the fiscal year. As originally located, the grades were very steep, in some cases nearly or quite 20 per cent—much too steep to be used to advantage by automobiles.

The work of repairing and reconstructing this road so as to make it passable for cars was begun late in March, and was finished early in May. As reconstructed, the maximum grade is approximately 10 per cent, and the width is from 10 to 12 feet. In order to obtain a grade not exceeding 10 per cent, it was necessary to relocate about 10,000 feet of this road. It was planned to use these sections, together with the corresponding sections of the old road, in place of turnouts, splitting the traffic so that the cars would take the steep grade when going downhill and utilize the new road for the uphill climb. The road as thus reconstructed has been quite satisfactory except during very wet weather, when, owing to the character of the material of which it is composed, it is very muddy and slippery. As this road was built only to take care of the traffic while a new permanent road should be constructed, it was not considered that the comparatively small inconvenience suffered during the short time when the road is thus in poor condition would warrant the heavy expense of graveling necessary to remedy the trouble. The additional work done on this road this spring included the redecking and strengthening of one log bridge of 44-foot span and the installation of a complete system of pole culverts and small wooden bridges.

New location for north approach.—Surveys and careful studies were made for relocation of the north approach road past the Gardiner slide. Several locations were considered, but only two favorably, namely, (*a*) in the canyon, following the easterly side of the river past the slide; and (*b*) on the easterly side of the river over a bench of Mount Everts, thus avoiding the troublesome portion of the canyon entirely. The latter location was considered much preferable, and was recommended, as it would be entirely safe and its cost was estimated as less than one-third that of the road in the canyon. This recommendation was approved by the Chief of Engineers, but no appropriation for its construction had been made at the close of the fiscal year.

WEST APPROACH.

The west approach road extends from the west boundary of the park at Yellowstone, Mont., to the belt line at Madison Junction, a distance of 13½ miles. Very little maintenance work similar to that on the belt line was done on this road during the fiscal year, and none during the spring of 1918. During the summer of 1917 the oil macadam work in progress during the previous fiscal year was continued and about 1 mile of road surface 10 feet wide was thus treated during the year. The reduction in width of the oil macadam surface from 18 to 10 feet was made because it had been noticed that a large part of the traffic on the west approach was concentrated along a narrow strip in the center of the road, and it was considered that the expense of an increased width was not justified. However, the result of this reduction in width has not been satisfactory. Automobiles as a rule do not follow as closely the same tracks as horse-drawn vehicles; in fact, it is very desirable that they should not do so, as by distributing the wear the road is kept in very much better condition. A strip 10 feet wide is obviously too narrow to allow two cars to pass, and where a road is used as much as the west approach it means that cars are constantly running off over the edge of the oil macadam, which results in a continual raveling along the edges, soon amounting to serious damage. In addition to this raveling which has taken place, the bituminous surface has been broken through in many places, forming a number of small depressions which make the road rough and disagreeable. These depressions are apparently due to several causes, among which are probably the poor character of the stone, use of insufficient quantities of oil, and the application of oil at so low a temperature that sufficient penetration was not obtained. It will probably eventually be necessary to resurface nearly or quite all of the 4½ miles last treated with oil macadam. In resurfacing the width should be not less than 16 feet.

SOUTH APPROACH.

IN THE PARK.

During the season of 1917 maintenance work similar to that on the belt line, but relatively less, was done on this portion of the road. The past winter was particularly hard on this stretch of road.

Most of the bridges and culverts are comparatively temporary log constructions and are greatly in need of repair or replacement, a number of them being passable by cars only at very low speed and with more or less difficulty. This road is comparatively little used, especially in the early spring. Consequently, in view of the much more urgently needed work on the belt line and the fact that the approach-road through the south forest was, as explained in the following paragraph, badly damaged during the past spring and no funds were available for its repair, no work at all was done this spring on the south approach.

IN THE SOUTH FOREST RESERVE.

General maintenance work similar to that done on the belt line was devoted to the first 25 miles of road beyond the south boundary of the park. The remaining work on the Snake River Bridge, which was nearly finished during the previous fiscal year was completed. The Pilgrim Creek bridge, about 5 miles north of Moran, a log structure 366 feet long, was begun in August and completed on October 19, except for guardrails, handrails, and some work on the north approach. Where this bridge was installed a ford had formerly been in use. A 12-foot span, log bridge, 2 miles north of Moran, was also rebuilt, and a 6-foot culvert was constructed near the Pilgrim Creek bridge.

During the summer of 1917 work was begun on the realignment 19,000 feet long of the road from 10½ to 14½ miles south of the southern boundary of the Park. This realignment was made necessary by the flooding of the old road, caused by the construction of the Jackson Lake reservoir by the United States Reclamation Service in 1914. Much of the realignment work was done with a power grader, drawn by the new 75-horsepower caterpillar tractor, the results being very satisfactory and economical. This work consisted chiefly in grading and in the installation of the following culverts, namely, log culverts, three 4-foot span and three 8-foot span; galvanized-iron culverts, one 12-inch, two 18-inch, and two 24-inch; also several existing log culverts were repaired and extended. The total cost of the Jackson Lake realignment was $5,000, which was reimbursed by the Reclamation Service.

In the spring of 1918 all streams in the southern portion of the park and in the forest reserve adjacent thereto were subject to high freshets, caused by the sudden melting of the snow in the early part of June. As a result of these freshets, the road was badly washed in many places, and Snake River and Pilgrim Creek Bridges, described above, were seriously damaged. At one time it was expected that both bridges would be carried away entirely. At that time it was impracticable, on account of the snow and the poor condition of the roads, to get men and horses from headquarters to the south approach. Consequently arrangements were made by wire with the forest supervisor and with the cavalry garrison at the Snake River Soldier Station to do such work as was practicable to save the bridges: As a result of energetic work on the part of the forest supervisor and the soldiers, both bridges were saved. The upstream end of the northerly pier of the Snake River Bridge was badly undermined and has sunken, while the southerly pier has remained in its original condition. This results in the bridge being twisted. The southerly end is level, but at the northerly end the easterly side is about 22 inches lower than the westerly side. It is believed, however, that the steel truss is not seriously damaged and that it will be comparatively easy to make the necessary repairs, which will, however, doubtless involve the construction of a new pier. The approaches to the Pilgrim Creek Bridge were damaged, but the bridge remains in good condition and the necessary repairs will not be very expensive.

EAST APPROACH.

IN THE PARK.

Owing to deep snowdrifts in Sylvan Pass, this approach was not open until July 8, 1917. During that season general repairs similar to those on the belt line were made to the 26 miles of road within the park. The bridge across Pelican Creek was redecked with poles, and repairs were made to its east approach. Repairs were made to the approaches of the so-called "fishing bridge" across Yellowstone River and to the bridge itself. Various small bridges and culverts were repaired, and a number of galvanized-iron culverts were installed. In the spring of 1918 this road was in fair to good condition from the belt line to Sylvan Pass, but at the close of the fiscal year it was not open through Sylvan Pass on account of snow. The only work done on this road this spring consisted of minor repairs to the Pelican Creek Bridge and a few other small bridges and culverts.

IN THE EAST FOREST RESERVE.

During the season of 1917 the remains of the old wooden bridge at Pahaska were removed; the 30-foot steel I-beam bridge across Grinnell Creek was completed by the construction of the reinforced concrete floor and handrails and by back filling the approaches; the approaches to the Clearwater and North Fork Bridges were completed, and these two bridges, built during the previous fiscal year, were placed in use. Throughout the season general repairs and maintenance work were carried on and were especially devoted to strengthening the bridges and culverts to carry the increased loads due to the use of motor-driven busses. In June, 1918, exceptionally high freshets, said to be the highest on record, took place, owing to a sudden spell of hot weather, which caused rapid melting of the snow, and which was followed by heavy rains. These freshets did serious damage to this road, causing very bad washouts in a dozen or more places, and seriously damaging the approaches to several of the bridges. As a result, this road was entirely impassable for vehicular traffic at the close of the year, and it was estimated by local persons that it would require at least $20,000 to restore it to its original condition. No funds were available this spring for work on that portion of the approach outside the park. Consequently nothing could be done by this office toward rendering the road passable. It is understood, however, that a large number of citizens from Cody and the surrounding country were engaged on repairs to this road at the close of the fiscal year.

COOKE CITY ROAD.

During the season of 1917 general repairs were made throughout that portion of the road from the Tower Falls Soldier Station to the northeast boundary of the park near Cooke City. Extensive repairs were made to the log bridge across Pebble Creek, constructed in 1915 by the Buffalo-Montana Mining Co. This bridge was repaired in 1916 by the builders, but during the spring freshets of 1917 the center pier and west abutment were undermined. Minor repairs were made to various other bridges and culverts. Early in the spring of 1918 a small crew was sent over this road to repair some of the small culverts which had broken down and to turn the water from the road to prevent washing. In June, 1918, the old wooden bridges across the Lamar River and Soda Butte and Pebble Creeks were carried away by high freshets, caused by suddenly melting snow. As a result, the road was completely closed to traffic at the Lamar River. This road is little used by tourists, its main use being as a commercial road for carrying supplies and ore to and from Cooke City. On this account and because of so much other more urgently needed work, no effort had been made by this office at the close of the fiscal year to rebuild the bridges referred to nor to open the road to traffic. Private parties connected with mining and other interests at Cooke City had, however, rigged an overhead cableway (for which this office supplied some of the material) by which people and light supplies could be transported across the river. Other private parties, also connected with Cooke City, were making preparations for the reconstruction of the Lamar River Bridge.

During the season of 1917 considerable work was done on this road by the Yellowstone Mining Corporation, with headquarters at Roanoke, Va., and branch offices at Livingston and Cooke City, Mont. In this work Mr. R. I. McKay, of Cooke City, also took considerable part. According to a report by the persons doing the work, it was started on June 16, 1917, and continued until July 20, 1917, with a force of from 15 to 18 men and 12 horses. The work consisted in repairing broken culverts and bridges, removing slides of earth and rock from the road, opening old drains and constructing new ones, repairing and shaping the road with a drag, and such other repair work as was necessary. This work was chiefly on the Cooke City road, between Tower Falls Soldier Station and Cooke City, but four and one-half days' work with the entire crew was said to have been done between Fort Yellowstone and Tower Falls Station. The total cost of this work is stated by those doing it to have been $2,523.33, of which nearly $1,500 was apparently expended during the fiscal year. Some of the road tools and machinery used on this work were borrowed from this department, but no direct supervision of the work was maintained by this office.

In connection with this private work, it may be remarked that a United States Engineer road crew was sent over this same road during August and September, being engaged on the work practically a month; and the condition of the road at that time did not indicate to the section engineer in charge that as much work had been done as would appear from the amount of money reported as spent on the private work referred to. The cost of the Government work on this road was $1,138.

COAL MINE.

During the latter part of the season of 1917 an old coal mine in the face of Mount Everts and about midway between Fort Yellowstone and Gardiner was reopened with the object of producing coal for the use of this department and the Interior Department. This mine had not been worked for many years, and the entrance tunnel had been robbed before it was abandoned and, as a result, had caved in badly. It was consequently necessary to open a new tunnel, driving it about 85 feet before striking the coal. Work was begun early in October and continued until February 20, 1918. During this time 467.4 short tons of coal were mined and most of it delivered at Fort Yellowstone. A small quantity, however, was used by the steam shovel at the Gardiner slide. The cost of the coal delivered at Fort Yellowstone was $9.27 per ton, of which $2.53 is chargeable to development, $5.23 to mining, and $1.51 to hauling. The high cost of the mining is due to the work having been carried on on a comparatively small scale and during the winter when weather conditions were very unfavorable, also in a large measure to the character of the roof which made it necessary to timber continuously. The high cost of hauling is due to the location of the mine, which is only accessible by a very steep road, too steep to use automobile trucks, so that all hauling had to be done with four and six horse teams. The coal is a good free-burning coal, quite satisfactory for domestic and steam use. The amount mined supplied the entire needs of this department during last winter and spring, and at the close of the fiscal year enough was on hand to last until fall.

COST OF WORK ON DIFFERENT SECTIONS OF ROAD, FISCAL YEAR 1918.

MAINTENANCE AND REPAIR.

Roads in park, 293 miles:	
Headquarters, general railroad and park freight and express and general supplies	$26,259.46
Property, plant, and equipment	13,381.56
Purchase, operation, and repair of passenger-carrying vehicles	2,985.58
Dust prevention, sprinkling about 99 miles with water	16,521.05
Road surface, maintenance, and repair	13,105.85
Bridges, maintenance and replacement of	20,842.33
Retaining and guard walls, clearing roads, protecting against slides, and resurfacing	3,404.84
Maintenance of road past Gardiner slide	6,155.85
Realignment, regrading, and widening	2,274.35
Continuation of Firehole River realignment	13,188.10
Spring repairs, spring, 1918	4,933.27
Repairs, reconstruction, and relocation of old hill and freight road, Fort Yellowstone to Gardiner	4,154.63
Stage platforms, board walks, shrubbery	690.06
Surveys and reconnaissances	682.68
Forage, rations, supplies, materials, etc	2,377.62
Contingencies	6,269.09
	137,226.32
Forest reserve road east of Park, 28 miles:	
Headquarters, general railroad and park freight and express and general supplies	709.55
Maintenance and repair of roadway, bridges, and culverts	3,807.86
Property, plant, and equipment	482.59
	5,000.00

Forest reserve road south of park, 60 miles:

Headquarters, general railroad and park freight and express and general supplies	$1, 193. 56
Maintenance and repair of roadway, bridges, and culverts	5, 331. 17
Property, plant, and equipment	975. 27
Jackson Lake realignment	5, 000. 00
	12, 500. 00

RESURFACING BELT LINE AND FINISHING WITH OIL MACADAM.

Headquarters, general railroad and park freight and express and general supplies	$3, 317. 43
Property, plant, and equipment	5, 395. 93
Surfacing and finishing with oil macadam section of road from Norris toward Fort Yellowstone	8, 797. 93
	17, 511. 29

APPROPRIATIONS.

Act.	Administration and protection.	Roads and bridges.	Total.
Total of appropriations to Dec. 31, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess.)	$100, 348. 02	$1, 008, 586. 23	$1, 108, 934. 25
Mar. 3, 1903	5, 000. 00	250, 000. 00	255, 000. 00
Apr. 28, 1904	7, 500. 00	250, 000. 00	257, 500. 00
Mar. 3, 1905	7, 500. 00	133, 000. 00	140, 500. 00
June 30, 1906	7, 500. 00	55, 000. 00	62, 500. 00
Mar. 4, 1907	8, 000. 00	75, 000. 00	83, 000. 00
May 27, 1908	10, 500. 00	65, 000. 00	75, 500. 00
Mar. 4, 1909	8, 000. 00	65, 000. 00	73, 000. 00
June 25, 1910	8, 500. 00	75, 000. 00	83, 500. 00
Mar. 4, 1911	8, 500. 00	70, 000. 00	78, 500. 00
July 1, Aug. 1 and 16, 1912	....	11, 666. 66	11, 666. 66
Aug. 24, 1912	8, 500. 00	165, 333. 34	173, 833. 34
June 23, 1913	8, 500. 00	200, 000. 00	208, 500. 00
June 30, and July 16, 1914	....	16, 666. 67	16, 666. 67
Aug. 1, 1914	8, 500. 00	238, 333. 33	246, 833. 33
Mar. 3, 1915	8, 500. 00	195, 000. 00	203, 500. 00
July 1, 1916	5, 500. 00	197, 200. 00	202, 700. 00
June 12, 1917	5, 500. 00	167, 500. 00	173, 000. 00
	216, 348. 02	3, 238, 286. 23	3, 454, 634. 25
Less amount reverted to Treasury, July, 1904, appropriation 1901–2	....	621. 22	621. 22
Net total	216, 348. 02	3, 237, 665. 01	3, 454, 013. 03

TRAFFIC STATISTICS.

The following statistics are compiled from data furnished by the acting superintendent of the park:

Tourists entering the park during the fiscal year.

Kind of transportation used.	Entrance used.					Total.
	North.	West.	East.	South.	Northeast.	
In autos of Yellowstone Park Transportation Co.	5, 403	5, 344	1, 874	....	....	12, 621
In private autos	7, 442	8, 910	4, 727	328	203	21, 610
In horse-drawn vehicles	258	398	65	28	59	808
Total	13, 103	14, 652	6, 666	356	262	35, 039

Number of private autos entering park.[1]

Entrance.					Total.
North.	West.	East.	South.	Northeast.	
2,044	2,305	1,304	98	49	5,800

---

[1] Only private autos are listed here, as there is no available data as to number used by the Yellowstone Park Transportation Co. nor the number of trips made by them.

CRATER LAKE NATIONAL PARK, OREGON.

REPORT OF COL. GEO. A. ZINN, CORPS OF ENGINEERS.

The field operations during the fiscal year were carried on by a hired labor force, varying from a few men and teams at the first and last parts of the season to a maximum of about 120 men and 35 teams for a short time during the middle of the season. Owing to stormy weather active field operations were suspended the 22d of October, 1917, and not resumed until the early part of May, 1918. The work accomplished during the fiscal year consisted of clearing, grading, and draining 6¼ miles (6.46 W. to 9.46 W. and miles 15.4 W. to 18.5 W. and miles 6.34 W. to 6.46 W., completion of partial grading only) of the Rim Road; the temporary Wheeler Creek bridge on Pinnacles Road, two temporary bridges on the Fort Klamath Road, and three temporary bridges on the Rim Road were torn out and replaced by corrugated-iron culverts and fills; the maintenance of roads previously constructed; and surveys of the roads constructed during the year.

CONSTRUCTION COSTS, FISCAL YEAR 1918.

Rim Road.—Miles 6.34 W. to 9.46 W. and miles 15.4 W. to 18.5 W.:	
Clearing 18.2 acres	$4,213.74
Grading, Class 1, earth, 30,232 cu. yd	16,893.14
Grading, Class 2, loose rock, 1,714 cu. yd	3,128.81
Grading, Class 3, solid rock, 8,820 cu. yd	9,081.60
Cross drainage (corrugated-iron culverts) 3 only	286.60
Engineering and administration expense	3 313.00
Total for Rim Road	36,916.89
Pinnacles Road: Cross drainage, one corrugated-iron culvert	178.73
Fort Klamath Road: Cross drainage, two corrugated-iron culverts	180.88
Maintenance of roads:	
Rim Road, regrading and rolling 12 miles	1,001.70
Pinnacles Road, regrading and rolling 3.24 miles	244.46
Fort Klamath Road, regrading and rolling 11.45 miles	1,012.25
Medford Road, regrading and rolling 6.84 miles	259.59
Engineering and administration expense	482.00
Total expenditures for repairs to existing roads	3,000.00

Summary.

Rim Road		$36,916.89
Pinnacles Road		178.73
Fort Klamath Road		180.88
Repairing graded roads		3,000.00
Miscellaneous expenditures, telephone, etc		2,370.11
Total cost of work during fiscal year ending June 30, 1918		42,646.61
Plant purchased, supplies not consumed, and outstanding liabilities		18,889.51
Total expenditures and liabilities to June 30, 1918:		
Expenditures	$54,736.12	
Liabilities	6,800.00	
		61,536.12

APPROPRIATIONS.

June 25, 1910	$10,000.00
Aug. 24, 1912	50,000.00
June 23, 1913	75,000.00
Aug. 1, 1914	85,000.00
Mar. 3, 1915	50,000.00
July 1, 1916	50,000.00
June 12, 1917	50,000.00
Total	370,000.00
Unexpended balance 1915, reverted to general fund of Treasury	1,712.62
	368,287.38

CONSTRUCTION AND MAINTENANCE OF MILITARY AND POST ROADS, BRIDGES, AND TRAILS, ALASKA.

REPORT OF THE BOARD OF ROAD COMMISSIONERS FOR ALASKA, MAJ. WILLIAM H. WAUGH, ENGINEERS, NATIONAL ARMY, PRESIDENT AND ENGINEER OFFICER; CAPT. JOHN ZUG, ENGINEER RESERVE CORPS, ASSISTANT ENGINEER OFFICER; FIRST LIEUT. SIDNEY, L. CARTER, ENGINEER RESERVE CORPS, DISBURSING OFFICER.

OPERATIONS DURING THE FISCAL YEAR.

The work during the fiscal year ending June 30, 1918, was executed under an appropriation for "Construction and maintenance of military and post roads, bridges, and trails, Alaska, 1918–19, approved May 2, 1917; and with receipts from the Alaska fund, act of Congress approved January 17, 1905, and amended by act approved May 14, 1906, and in conformity therewith." The work consisted generally of the maintenance and improvement of existing roads, trails, bridges, construction of extensions to present roads and trail system, and construction of new roads, trails, and bridges throughout the Territory. Nine hundred and eighty miles of wagon road, 623 miles of sled road, and 2,291 miles of trail were maintained. New construction during the fiscal year added 26 miles of wagon road, 50 miles of sled road, and 55 miles of trail, making the present mileage 1,006 miles of wagon road, 673 miles of sled road, and 2,346 miles of trail, or a total of 4,025 miles. Approximately 300 miles of wagon road can be classed as "improved road," mostly gravel surfaced, but including a small percentage of planked roadway.

ORGANIZATION.

The headquarters of the commission are located at Juneau. At the beginning of the fiscal year the Territory was divided into five districts. The southeastern district comprised that part of Alaska south and east of the one hundred and forty-first meridian; the Valdez district, the country west of the one hundred and forty-first meridian, running as for north as Richardson on the Valdez-Fairbanks Road, and bounded on the west by the one hundred and forty-eighth meridian; the southwestern district, the territory between the one hundred and forty-eighth meridian and Kuskokwim River, including the Tacotna and Ophir sections. The Yukon district began at the north boundary of the Valdez district at Richardson, and included all work along the Yukon River, the country around Fairbanks, and the Tanana River Valley. The Nome district is confined to the Seward Peninsula.

Each district was in charge of a district superintendent, the superintendents of the Yukon and Nome districts also being bonded disbursing clerks. This arrangement has been continued except that in the spring of 1918 the Valdez-Chitina-Fairbanks Road and all connecting wagon roads were placed under the direction of a district engineer, with headquarters at Valdez. During the present summer the Fairbanks office was placed in charge of Capt. John Zug, Engineer Reserve Corps, assistant engineer officer of the board; at the end of the season it will be closed for the winter. Under each superintendent are foremen in charge of working crews on different projects. The crews are often working far from headquarters and the distances are so great and means of transportation so uncertain and slow that it is difficult for the superintendents to visit all of the projects in their districts. As the principal working season begins in June and ends in October the superintendent is a busy man and his efforts are necessarily confined to the most important projects.

MACHINERY AND EQUIPMENT.

The additional machinery purchased during the fiscal year 1918 consisted of the following:

2 tractors, 12–25 horsepower.
1 road grader, 8 foot.
3 road graders, 6 foot.
4 road drags, 3-way.
2 auto trucks, light.
4 auto trucks, heavy.

An old model tractor of the track-layer type was rented and used last season near Fairbanks, and demonstrated that tractors are well adapted for pulling graders, drags, etc. Certain sections of the Valdez-Fairbanks Road are now in condition for tractor operation and in another year 60 per cent of the road will be suitable for these machines.

In June, 1918, two 12–25 horsepower tractors of the wheel type were shipped to Fairbanks, where they are being given a thorough test on a hundred mile section, with very satisfactory and economical results. At present each tractor is doing the work of eight horses, at a daily operating cost about equal to the cost of feeding three horses.

Definite data showing the relative costs of work done by tractors and by horses will not be available until the end of the present season, but it is apparent that in Alaska the tractor has numerous advantages over horses, which must be fed throughout the year, although the working season is never more than five months in length. During part of the winter the horses are used to haul and distribute supplies for the next season's work, but the cost is extremely high, due to high wages and cost of boarding teamsters, the large amount of forage consumed by the horses while doing the work, the time lost through extremely cold weather, etc. While it will be necessary to do a certain amount of this winter freighting for some time to come, a tractor will be used experimentally this fall to test its desirability for freighting during the open season.

The tractor has further advantages in requiring fewer men for its operation, with consequent reduction in the weight of supplies to be hauled. Its wide wheels have the effect of a roller in forming a hard and compact roadway, and it can be used effectively for pulling the "three-way" steel road drag, weighing 1,200 pounds.

It is intended to purchase the following machinery in 1919:

2 Tractors, 12–25 horsepower.
2 Road graders, 8-foot.
2 Road drags, three-way.
3 Auto trucks, light, three-fourths ton.

SUBSISTENCE.

The matter of subsistence was complicated this year by the conservation and substitute regulations promulgated by the United States Food Administration and the scarcity of good economical cooks. It is hard to secure much of a variety and the tendency is to serve the entire list of varieties at each meal. The extreme cost of transportation requires that the best grades of supplies be used. The bulk of these are purchased in Seattle late in the fall and are freighted in to caches during the winter months. Perishables are purchased in the local markets by competitive bids during the working season. The subsistence cost is from $1 to $1.50 per day per man, not including transportation from the point of railroad or steamer delivery, or wages of the cook.

SUMMARY OF WORK ACCOMPLISHED.

SOUTHEASTERN DISTRICT—J. C. HAYES, SUPERINTENDENT.

Route 1. Prince of Wales Island Road (4.1 miles road, 6.8 miles trail).—The only work done on this route consisted of replacing planking, at a cost of $88.50.

Route 2. Juneau-Eagle River Road (16 miles road, 14 miles trail).—Connects Juneau and Eagle River; also connects with Auk Bay extension at mile 10. The Mendenhall Glacier, all dairies supplying Juneau, several ranches, two large power houses supplying power for the Juneau mines and industries are reached by this road, and it is the most popular recreation drive of Juneau.

The entire road was given a light surfacing of gravel. It is narrow in many places, but otherwise is very satisfactory for automobile travel. Iron was purchased for new bridge at Salmon Creek and concrete abutments were put in. Amount expended for construction $7,910 and $4,290.52 for maintenance.

Route 2A. Auk Bay extension (connects at mile 10 with Juneau-Eagle River Road).—During the year 2¼ miles were cleared and 1 mile completed. Bridges were constructed as follows: One 140 feet long, two 38 feet long, one 40 feet, three of 14 feet. Four culverts were built, and the Mendenhall River Bridge was repaired. The completion of this road will greatly increase the value of the Juneau-Eagle River Road. Fishing boats will then be able to anchor at Auk Bay and connection can be made with Juneau by road. The water route is 25 miles long and at times very rough and dangerous for small craft. In the spring of 1918 labor was very scarce and work was not resumed until after June 30: $15,174.51 was expended for construction and $1,200 for maintenance.

Route 3. Haines-Pleasant Camp Road (47.5 miles wagon road).—Connects Fort Seward and Haines at tidewater with Pleasant Camp, on Canadian boundary. The Porcupine Gold Mining Co. and mines of the Glacier Creek Gold Mining Co. are reached by this road, which also connects at Pleasant Camp with Canadian Road to Rainy Hollow, where a very large copper district is being developed. Klukwan, the largest Indian village in Alaska, is located at mile 22. The location for 24 miles follows the Chilkat Valley where numerous ranches are located; $8,398.73 was expended for maintenance. graveling, and replacing bridges.

Route 14. Sitka-Indian River Road (3.4 miles).—This road runs from Sitka to head of Jamestown Bay, passing through the Indian River Park, set aside by the Government. A new 50-foot Howe truss bridge was constructed and 2,000 feet of new road to reach the bridge was provided; total cost, $2,476.20.

Route 39. Juneau-Sheep Creek Road (3 miles).—This road connects Juneau with Thane, where the extensive mill of the Alaska Gastineau Mining Co. is located. The road has very heavy travel between the two towns and, as it was lightly surfaced, requires considerable upkeep; $4,270.74 was expended for maintenance and improvement.

Route 40. Douglas-Gastineau Channel Road (2 miles).—Extends from city limits of Douglas along Gastineau Channel. Several ranches and homes are located along the road; $659 expended for maintenance and improvement of several soft places.

Route 43. Petersburg-Scow Bay Road (5 miles).—No expenditure during past year. The road was only partially constructed and will be completed by the United States Forestry Service and Territorial Road Commisison when funds are available.

Route 44. Skagway Valley Road (2.5 miles).—When work was started the intention was to build from Skagway to Canadian boundary, 13.5 miles. The Canadian authorities agreed to build from boundary to White Horse, but were compelled to abandon the project temporarily. Present road is used by several ranches; $1,966.63 was expended for protecting the bridge over Skagway River and for maintenance.

Route 45. Silver Bow Basin Road (4 miles).—This road runs from Juneau to Alaska, Juneau, and Perseverance mines, and the Ebner mine of the United States Mining & Smelting Co. It follows the mountain side, is narrow, and has many steep grades. The route is much traveled and will be improved as funds and conditions will permit; $5,049.55 was expended for maintenance and improvements.

Stikine River Trail (10 miles).—Constructed over a formerly impassable section between the Stikine River and tidewater. The work was done under the supervision of the United States district forester and in cooperation with the Bureau of Forestry; amount expended by the Alaska Road Commisison, $1,999.72.

VALDEZ DISTRICT.—C. G. MORRISON, C. E., DISTRICT ENGINEER.

Route 4A. Donnelly-Washburn sled road (55 miles).—Miscellaneous bridge repairs were made and temporary winter bridges across the several open channels of the Big Delta River were constructed. The temporary bridges were taken out in April, 1918, and stored for future use; amount expended, $1,341.50.

Route 4B. Valdez–Ernestine Road (*63 miles*).—As usual, the maintenance on the section between miles 10 and 18 has been extremely heavy. Annually the extreme high water in the Lowe River, caused by the bursting of glacial reservoirs, necessitates the repair and oftentimes reconstruction of sections of grade in and below Keystone Canyon. This past season has been no exception. Whenever the crews are not engaged in general maintenance they are used in surfacing the bad stretches of road with gravel. This surfacing now extends, with the exception of a few short stretches, to Beaver Dam (mile 42), making the road passable even in the worst of the spring or rainy seasons. One mile of new grade was constructed in addition to general maintenance. The work of this spring consisted of repairing damages resulting from the break-up, building new road to take the place of that destroyed, and constructing diversion spur dikes and placing fascine protection with the hope of preventing further damages and inroads from the glacier streams. It is believed that the unusually heavy maintenance cost of this section warrants relocating that portion of the road from mile 12 to mile 18, as the most of the money allotted to this route is usually expended for work in that vicinity. This change is roughly estimated to cost $25,000; $33.697.87 of the year's expenditure was charged to maintenance and $20,500 to construction, a total of $54,197.87.

Route 4C. Ernestine–Willow Creek Road (*29.3 miles*).—In addition to the ordinary maintenance, all graded portions of the road were dragged. One 24-foot bridge was constructed, 5 bridges and 21 culverts were rebuilt, and seven 6-foot culverts reconstructed. Numerous slides were removed and washouts filled. Approximately 700 cubic yards of gravel surfacing was placed in soft sections of the road. Two and one-fourth miles of new grade was constructed; $7,535.18 was charged to maintenance and $3,450 to construction.

Route 4D. Willow Creek–Gulkana Road (*36 miles.*)—A small maintenance crew only was employed on this section during the latter part of the 1917 working season, as the road had been placed in excellent condition previous to July 1, 1917. At the end of the working season two large crews were concentrated here for a short period grading 4¾ miles just north of Copper Center. In the spring the road was dragged several times and numerous culverts reconstructed. All cribbing was repaired and drainage ditches opened up. Three and one-half miles of new grade and 880 linear feet of ditches were constructed and 18 culvets were repaired, and 6 new culverts were built. Maintenance expenditures amount to $19,654.26, with $7,050 for construction.

Tazlina Bridge.—Work was completed prior to June 30, 1917. Expenditure of $956.01 made during 1918 and charged to construction, for freight on material shipped from Seattle.

Route 4E. Gulkana–Sourdough Road (*21.5 miles*).—In addition to general maintenance there was constructed on this section 15 miles of new grade with the accompanying clearing and grubbing, 138 new culverts, and 1,250 feet of drainage ditches. Also old culverts were rebuilt. Maintenance, $4,064.17; construction, $15,000.

Route 4F. Sourdough–168 Mile Road (*18.2 miles*).—Only light maintenance was necessary on this section during the latter part of the 1917 working season as a large crew had worked here previous to July 1. In the spring of 1918 several culverts were reconstructed and ordinary maintenance work was done. Maintenance expenditures, $11,517.54.

Route 4G. 168 Mile–Delta River Road (38.8 miles).—General maintenance of this section was supplemented by placing approximately 440 cubic yards of gravel surfacing, clearing to a width of 100 feet 1 mile of road which was previously blocked by deep snowdrifts until late in the season, placing 123 linear feet of corduroy, constructing 118 linear feet of log culverts, and the grading of 12¼ miles of road. The spring work on this section consisted of the removal of numerous earth slides, the reconstruction and repair of culverts, the removal of snowdrifts and glaciers from the road, bridges, and culverts. The crew on its way into the interior in April found it necessary to provide new end posts and top chords for the bridge at mile 207, which had failed on account of the settling of a glacier which had become frozen to it. Two new framed truss bridges of 36 feet span—one at mile 226 and the other at mile 227—were constructed. Heavy dikes were built upstream from these structures to concentrate the glacier water at the bridge. Maintenance, $4,280; construction, $9,705.16.

Route 4H. Delta River–McCarty Road (73.4 miles).—A considerable improvement was made in this road during the latter part of the 1917 season. In addition to the general maintenance there was constructed 14.5 miles of new grade, one framed truss of 40 feet span in mile 208, 1,165 linear feet of diversion dike in mile 208, and 7 culverts. Gravel surfacing to the amount of 1,560 cubic yards was placed, and 3.2 miles of road were regraded. In the spring a new 65-foot framed truss bridge was constructed at mile 236. Washouts and minor damages due to the break-up were repaired. Snowdrifts were opened up and slides were removed. Two new towers were erected for the McCarty ferry, and the scow was recalked. Later the graded sections of the road were dragged. Maintenance, $20,660; construction, $22,101.

Route 4I. McCarty–Richardson Road (20.6 miles).—During the later part of the working season of 1917 no maintenance was required on this section, as the entire length had been placed in excellent condition prior to the 1st of July, 1917. During the spring of 1918 this section was put in excellent repair, the graded portions through lowlands being dragged several times, and all unsound flooring in culverts and bridges replaced by new timber. A new wooden truss bridge having a total length of 117 feet replaced the old structure at Shaw Creek. Maintenance, $8,470; construction, $2,006.83.

Route 6A. Willow Creek–Tonsina Road (24 miles).—As this road had been placed in good condition over its entire length during the month of June, 1917, no further maintenance was needed during the remainder of the year. During the spring this section was thoroughly dragged. Maintenance, $2,832.51.

Route 6B. Tonsina–Chitina Road (15 miles).—In addition to the general maintenance of this section, such as the repair of culverts and bridges, cleaning out ditches, and repairs to the grade, there were placed 1,210 cubic yards of gravel surfacing. In the spring of 1918 ordinary maintenance was continued as well as extensive improvements by placing gravel surfacing out to mile 13, widening all sharp turns, placing turnouts, and opening of two new gravel pits. Temporary loading bins were constructed at each of these pits, the bins were filled by slip scrapers and team, material being hauled by three auto trucks. Maintenance, $10,280.55; construction, $13,750.

Kuskulana Bridge.—In fall of 1917, $302.15 was expended for inspection and survey of site for proposed bridge across the Kuskulana River, about 10 miles northeast of Strelna, on the Copper River Railroad. It is understood that the territorial road commission has this bridge under construction.

YUKON DISTRICT—C. G. MORRISON, C. E., DISTRICT ENGINEER.

Route 4J. Richardson to Salchaket (30 miles) (Valdez-Fairbanks Road).—Eight miles were graded and 115 culverts were constructed at a total cost of $22,172.98. During spring of 1918 eight men were employed removing slides, opening up ditches, bridges, and culverts. One crew of 20 men was employed 10 days on the Richardson Hill placing the entire section in excellent condition. Cost of maintenance, $6,680.41.

Route 4K. Salchaket-Fairbanks (40 miles) (Valdez-Fairbanks Road).—Twenty-one and one-half miles were graded on the new location made necessary by encroachment of the Tanana River. Three 40-foot bridges and 72 culverts were constructed. Construction cost, $43,805.71. The towers for the Munson ferry were rebuilt, and the scow was repaired. The whole section was dragged, and general maintenance work was done at a cost of $5,400.71.

Route 5. Ester-Fort Gibbon Sled Road (148 miles).—This route is a part of the Fairbanks-Nome winter mail route. All culverts were repaired, and lakes and open country staked for the safe guidance of winter travel. Cost, $470.08.

Route 7D, Ester Creek Road (5½ miles).—Connects Ester Creek with Route 5 and forms part of winter mail route between Fairbanks and Nome. Road also runs from Fairbanks to the Department of Agriculture Experimental Farm. The road was entirely regraded, about 2 miles being on a new location; 25 culverts were constructed, and 2,740 linear feet of corduroy was laid. Total cost of construction was $10,535.91.

Route 9. Rampart-Eureka Road (6½ miles road, 21½ miles sled road).—Fourteen bridges and 24 culverts were rebuilt or repaired. Other work consisted of general maintenance. Total cost, $1,434.

Route 11A. Eagle-O'Brien Creek-Forty Mile Road (17 miles road, 30 miles sled road).—From Eagle, on the Yukon River, to mines on Forty Mile Creek. The work consisted in rebuilding and repairing bridges and culverts, clearing slides, widening grades, and general maintenance. Total cost, $1,614.

Route 11E. Eagle-Seventy Mile sled road (20 miles).—From Eagle, on Yukon River, to mines on Seventy Mile Creek. General repair and maintenance work was done to the amount of $386.

Route 15. Circle-Miller House Road (49 miles).—From Circle, on Yukon River, to Miller Road House. In addition to general maintenance, 1 mile of road was reditched and graded and 89 culverts were rebuilt or repaired. Foot travelers now cross Birch Creek on a new overhead cable car. Total expended for maintenance, $5,066.

Route 16. Chatanika Miller House sled road (81 miles).—All culverts were repaired, slides were removed, and general maintenance work was carried on. Cost, $700.

Route 17. Fort Gibbon-Kaltag Trail (257 miles).—A part of the Fairbanks-Nome winter-mail trail, connecting the Army post at Fort Gibbon with Kaltag, both places being on the Yukon River. Three small bridges were built by contract for $105. Maintenance work consisted of temporarily staking open sections, at a cost of $328.

Route 22. Hot Springs-Sullivan Creek Road (9 miles).—From Hot Springs, on the Tanana River, to mining district at Sullivan Creek. Work consisted of general maintenance, repairing bridges and culverts. Cost of maintenance, $1,352.82.

Route 29. Fort Gibbon-Koyukuk Trail (146 miles).—From Fort Gibbon, on the Yukon River, to Arctic City, on the Koyukuk River. General maintenance from Fort Gibbon to mile 38. From this point to mile 75 a new trail was cleared and a 75-foot bridge at mile 48 was constructed. Through open country the trail was marked every 100 feet by 4-inch stakes 10 feet high. The open country has heretofore been very dangerous and has caused much hardship to travelers during blizzards. Total cost for maintenance, $330.98; construction, $2,669.02.

Route 30. Hot Springs Landing-Eureka Creek Road (32 miles).—From Hot Springs Landing to Eureka mining district. Work done was chiefly confined to the section between Hot Springs Landing and Hot Springs Station, distance 2 miles. Four bridges were repaired, four new culverts built, 665 feet of corduroy was laid and covered, and 2,100 feet of side ditches were cut. General maintenance work was done on the entire section. During the high water in the spring of 1918 the Tanana River overflowed and washed out several bridges. These will be replaced during the 1918 working season. Cost of maintenance, $1,678.88.

Route 38A. Ruby Long Road (28.25 miles).—From Ruby, on the Yukon River, to the Long Creek mining district. Approximately 2,000 tons of freight were handled over this road during the year. General maintenance work was done on first 19 miles, at a cost of $6,868.78. Nine miles of new road were constructed during the year for $37,217.70.

Fairbanks Bridge.—During the fall of 1917 the entire bridge was given two coats of paint and the amount, $1,448.03, was charged to construction.

SOUTHWESTERN DISTRICT—ANTON EIDE, SUPERINTENDENT.

Route 24. Moose Pass Road (29.5 miles).—From mile 29, on Alaska Northern Railroad, to connection with Route 12 to Sunrise and Hope, on Turnagain Arm. This section has produced a considerable amount of gold and much ground has a known value, but the mines are not operating extensively, on account of present labor conditions and high cost of supplies. For these reasons travel is light. Work consisted of widening the road and right of way in many places, ditching, and general maintenance. In September, 1917, a cloudburst did considerable damage and about half of the season's work had to be done over; $6,480.21 expended.

Route 10. Seward-Kenai Lake Road (7.75 miles).—This road was in excellent condition until the heavy rains of September, 1917. The flood carried away entire section of road and several bridges and damaged other bridges. In addition to constructing two new 80-foot

Howe truss bridges at mile 3½, other bridges were repaired and damaged sections of road were rebuilt. Expenditures for maintenance and repair amounted to $8,295.34, and the cost of the new bridge was $2,281.75, a total of $10,577.09.

Route 19. Mile 34, Alaska Northern Railroad-Hope Road (31 miles wagon road, 9 miles sled road).—Work embraced widening road and right of way, replacing small bridges and culverts, and cutting out windfalls. Two miles of completely washed-out road were repaired and general maintenance performed, at a total cost of $5,972.19.

Route 35. Knik-Willow Creek Road (34 miles).—From Knik, on Knik Arm, to crossing of Government railroad at Wasilla, thence to Willow Creek mining district. Reaches a most promising quartz-mining district, producing about $250,000 per year, with strong indications of great increase and long life. Value of ore per ton is high, and although there is a shortage of labor and cost of supplies is high, these conditions are not as serious as in the low-grade districts. The last year was very wet, and road work was expensive. Twenty-eight acres of grubbing was done, in widening right of way, bridges and culverts were repaired, 4 miles were regraded, and gravel surfacing was placed on 2 miles. One new 35-foot frame bent bridge was constructed at mile 19 and a 14 by 16 warehouse was erected at Wasilla. A total of $22,696.39 was expended, $1,275 of which was for construction and the balance for maintenance and improvement.

Route 35A. Archangel extension (3 miles).—Connects with Knik-Willow Creek Road at mile 32. The road is entirely above timber line and all culvert and bridge material is hauled a long distance. Several culverts were constructed and material for a bridge over Archangel Creek was delivered. One and one-half miles of road was graded and one-half mile was lightly graveled, 300 linear feet of corduroy was laid, and several culverts were built; $733.35 expended for maintenance and $1,534 for construction; total, $2,267.35.

Talkeetna-Cache Creek Road (42 miles sled road and summer trail).—From point on United States Government railroad location at Talkeetna to the Cache Creek mining district. A good winter road, which is also passable for pack animals in summer, was constructed during the year. The Cache Creek district is one of large area and promises to be very productive. The production justifies improving the route for wagon traffic, and it is hoped to start this improvement within the next two years. Expenditures were $4,634.50, all for construction.

Palmer-Mile 26½ Road (8 miles).—From Palmer, on Government railroad, to mile 26, on the Knik-Willow Creek Road. Six miles of right of way was cleared, material for 1,500 feet of corduroy and timber for culverts was delivered. The clearing and grubbing was heavy, costing $345 per acre. The road will be completed as a winter sled road during the coming fiscal year. Further improvement will not be warranted until the farming country shows more development. Cost of work, $7,906.69.

Iliamna Bay Road (10 miles).—From Iliamna Bay to Iliamna Village, on Iliamna Lake, where water connection is made with Bristol Bay. Eight miles of trail were built. The season closed before work was completed, and 2 miles remain to be constructed. Work was greatly damaged by storms in September, 1917, but was repaired. Approximately $3,000 will be required to finish the road, as the balance of allotment and available funds were not sufficient to complete the project. Amount expended, $6,781.52.

Matanuska Bridge (over Palmer Canyon).—This bridge was erected to provide an outlet to the Government railroad for a farming community on the east side of the Matanuska River. It consists of one 150-foot combination span, one 100-foot combination span, and 190 feet of trestle approach. The season for construction was unfavorable, on account of deep frost, running ice, and high water. All material except piling was shipped from Seattle. The cost of construction was as follows:

Freight on material from Palmer to bridge site	$834.00
Piles and crib timbers, delivered	885.82
Driving piles (3,780 linear feet)	2,050.00
Overhauling iron and refitting timbers	450.00
Raising trusses	776.48
Putting on decking and hand rails	316.00
Building piers and abutments	366.60
Filling piers	499.00
General supervision	600.00
Material from Alaska Engineering Commission	300.00
Material from Seattle and freight on same	15,224.25
Total	22,252.15

Palmer-Matanuska Bridge Road (1.5 miles).—Connects Palmer Station on Government railroad with the new Matanuska Bridge. The work consisted in clearing and grubbing 500 feet of corduroy for wet sections, and light grading. Total cost, $2,489.71.

Kahiltna Bridge.—The September, 1917, storm carried away a part of the approach, which was replaced, and other repairs were made, at a total cost of $347.10.

Seward-Radio Road (1¼ miles).—Connects at Mile 2 with Seward-Kenai Lake Road and runs to United States naval radio station. Work was started June 8 at the request of the Secretary of the Navy, the cost, estimated at $6,500, to be reimbursed by the Navy Department. One mile was cleared and grubbed, 500 feet lightly surfaced with gravel, 18 piles for bridges have been driven, and bridge material is being delivered. Total cost to June 30, 1918, $2,589.15.

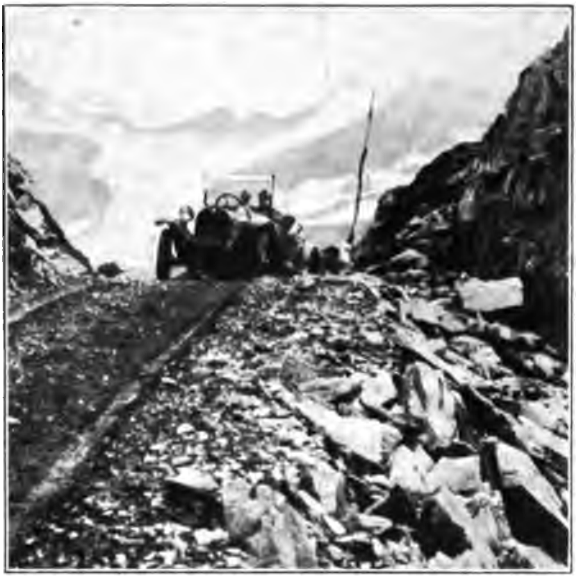
Route 20D. Tacotna-Ophir Road (23.5 miles, 7.4 miles constructed).—One and six-tenths miles were constructed on the Tacotna end and right of way cleared to mile 2.8; 5.8 miles were constructed on the Ophir end. The two camps produce approximately $100,000 per year in gold. It is hoped that funds will become available so the two ends can be connected by a cleared right of way and necessary bridges and culverts provided. Total amount expended was $19,949.52.

Route 20A. Knik-Susitna Trail (30 miles).—Ordinary maintenance cost $253.59.

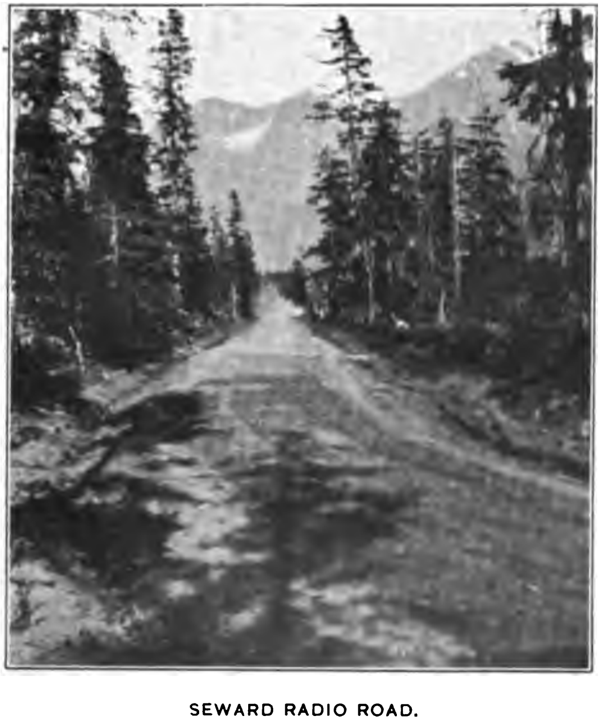
Route 20B. Susitna-Rainy Pass Trail (127 miles).—Maintenance $253.59.

Route 20C. Rainy Pass-Tacotna Trail (130 miles).—Maintenance, $263.79.

Work consisted of reblazing trees, erecting tripod markers where required, clearing away windfalls, and repairing three bridges. Expended for maintenance, $567.83.



VALDEZ-FAIRBANKS ROAD. THOMPSON PASS SUMMIT. ELEVATION 2,745 FEET. JULY 26, 1918.



SEWARD RADIO ROAD.

VALDEZ GLACIER. FROM MILE 1 ON VALDEZ-FAIRBANKS ROAD.

MATENUSKA PALMER BRIDGE. THROUGH SPANS, 100 FEET AND 150 FEET. CONSTRUCTED 1918.

MILE 4, SEWARD-KENAI LAKE ROAD.

NOME DISTRICT.—DANIEL A. JONES, SUPERINTENDENT.

Route 8. Nome-Council Road (82 miles; 60 miles constructed).—Nome-Fort Davis section (3½ miles). Work consisted of general maintenance, blasting out ice and opening channels under bridges in the spring, and graveling 4,800 feet of road.

Fort Davis-Cape Nome (9 miles).—This section was turned over to Territorial road commission, who constructed 2½ miles at a cost of approximately $19,000.

Cape Nome section (2 miles).—General maintenance expenditures, $228.

Solomon-East Fork (15 miles).—Connects Bonanza Ferry, the landing place for boats, with East Fork-Council Road. During open season traffic amounts to about 8 tons per day. General maintenance work was performed.

East Fork to Fox River (25 miles).—Connects Solomon-East Fork Road with Council Corduroy. Combination road and trail. Its improvement has been taken over by the Territorial road commission.

Council-Corduroy (5½ miles).—Connects Fox River with Council City. Territorial road commission is improving this section and spent a total of $5,300 during past year. The Safety and Bonanza ferries were maintained on this route at a cost of $906. Total expenditures for maintenance, Route 8, by Alaska road commission, $5,262.58.

Route 13A. Nome-Bessie Road. (3.29 miles).—Connects Nome with the Third Beach line. It serves to supply districts north of Nome. It is estimated that 30 tons of freight are hauled over this road daily, throughout the year. One thousand yards of gravel were hauled and spread by auto truck at a cost of 90 cents per cubic yard, the average haul being 1¼ miles. The crib piers of the Dry Creek Bridge were undermined by the spring freshet and had to be replaced by pile bents and the bridge generally overhauled at a total cost of $798.40. The fill crossing Dry Creek was widened 2 feet for a distance of approximately 300 feet, and a stone wall approximately 4 feet high and 300 feet long was built on the upstream side. The cost of maintenance during the break-up was $375. Work consisted of opening culverts, clearing ditches, and opening the channels under the Dry and Bourbon Creek bridges. Total maintenance cost, $3,935.71.

Route 13B. Bessie-Banner Road (3.46 miles).—Connects the Bessie with Banner station. It serves to supply Anvil and Glacier Creeks and all upper Snake River points. It is estimated that 4 tons per day are hauled during the open season. Work consisted of surfacing 7,515 feet with gravel, 1,671 cubic yards of gravel and rock having been hauled at a cost of $1.28 per cubic yard, average haul one-fourth mile. Twelve culverts cost $11 each; 2,100 feet of ditch was dug at a cost of 9 cents per foot. The entire road was rolled with a road roller drawn by auto truck, at a cost of $62.50. Maintenance, $3,038.52; construction, $2,200.

Route 13C. Bessie-Little Creek Road (1.25 miles).—Connects Nome-Bessie Road with Little Creek. Supplies the Third Beach line west of the Bessie and Little Creek. It is estimated that 10 tons daily are hauled over this road. During past year 2,600 feet of road was surfaced, 691 cubic yards of gravel having been hauled at $1.52 per cubic yard, average haul one-fourth mile. The road was rolled with a road roller drawn by an auto truck, at a cost of $30. Maintenance, $849.17.

Route 13D. Bessie-Dry Creek Road (1.25 miles).—Connects the Nome-Dexter Road with the Nome-Osborne Road. Supplies all camps on the Third Beach Line between Bessie and Dry Creeks. It is estimated that 100 tons of freight were hauled during year. Maintenance, $202.20.

Route 13E. Dry Creek-Newton Road (0.33 of a mile).—Connects the Bessie-Dry Creek with the Dry Creek-Osborne Roads. No expenditure during the past year and no freight hauled.

Route 13F. Nome-Osborne Road (4 miles).—Connects the Dry Creek-Newton road with Osborne Creek. Supplies Osborne Creek and vicinity. Estimated 2½ tons hauled daily during open season. Work consisted of general maintenance; 250 cubic yards of gravel hauled at $1.73 per yard, average haul one-half mile; 2,680 feet were resurfaced; 5,310 feet of ditch made at 3 cents per running foot; five culverts taken out, repaired, and lowered at $3 each. Maintenance, $824.41; construction, $85.30.

Route 13G. Grass Gulch (1.75 miles).—Connects the Nome-Bessie with King Mountain, and supplies mines on Grass and Deer Gulches, and King Mountain. No expenditures during year.

Route 13H. Center Creek Road (1.37 miles).—Connects the Nome-Bessie with Center Creek camps. No expenditure during the year.

Route 13I, Nome River Extension (5 miles).—Connects Dexter Creek with upper Nome River camps and supplies upper Nome River points. Five hundred and thirty linear feet surfaced with 142 cubic yards of gravel, costing 80 cents per cubic yard to haul and spread. Other work consisted of maintenance during spring break-up. Maintenance, $195.85.

Route 13J. Wonder-Flat Creek (2 miles).—Connects the Bessie-Little Creek Road with Wonder and Flat Creeks. It supplies the camps on Wonder and Flat Creeks and lower Little Creek. Thirteen hundred tons of freight hauled over road during past year, most of which consisted of material for a dredge which was constructed on Flat Creek; 2,050 linear feet was resurfaced with gravel at $1.18 per cubic yard, average haul one-fourth mile. Maintenance, $849.96.

Route 13K. Bessie-Buster (5 miles).—Connects the Bessie with Dexter and Buster Creeks. It is estimated that 40 tons per month are hauled over route; 19,750 linear feet was surfaced, 3,615 cubic yards of gravel having been hauled at $1.06 per cubic yard, average haul one-fourth mile; 9,500 feet of ditch cost 8 cents per foot. Twenty-four 2 by 2 culverts were built at a cost of $108. Maintenance, $4,090.39; construction, $6,315.47.

Route 18. Kaltag-Solomon Trail (248 miles).—From Kaltag on Yukon River to Solomon on the Nome Council Road. Staking and general maintenance cost $328.

Route 21. Unalaklik-St. Michael Trail (65 miles).—Maintenance $21.50.

Route 25. Sinrock Ferry.—The expense of maintaining this ferry consisted of the salary of the ferryman, employed for five months at a monthly salary of $50. or $250.

Route 25A. Cripple River Road (12 miles).—Connects the coast with Cripple River. No expenditures were made on this road during the past year.

Route 25B. Penny River Road (17 miles).—Connects the coast at mouth of Penny River with Oregon Creek. It is a combination road and trail. No expenditures.

Route 25C. Nome Wireless Road (800 feet).—Connects Nome with the wireless station. No expenditures.

Route 25D. Mouth of Center Creek Road (225 miles).—Connects Nome with the mouth of Center Creek. Supplies Lower Snake River and Lower Center Creek camps. An average of 3 tons daily hauled; 3,000 feet surfaced with gravel at $1.26 per cubic yard; average haul 2,000 feet. Maintenance, $846.33.

Route 25E. Submarine Paystreak Road (3 miles).—Connects Nome with the Submarine paystreak which parallels the coast west of Nome. Hauling estimated at 7 tons per day. Twenty-three culverts, 2 feet square and 16 feet long, were constructed at $14.16 each: 1,888 cubic yards of gravel hauled at $1.06 per yard; 2,030 feet of road constructed with grading machine and slip scrapers, costing forty-nine cents per linear foot; 5,000 feet of ditch, averaging 18 inches on the bottom and 2 feet deep, were constructed for 7 cents per foot. Construction, $3,867.63.

Route 25F. Anvil-Glacier Road (3 miles).—Connects Bessie-Banner Road with the Snake River Road. Supplies Glacier Creek and all Snake River points. Hauling estimated at 5 tons per day; 4,870 linear feet was surfaced with gravel at $1.59 per yard, average haul one-fourth mile; 655 feet of road was constructed, using slip scrapers and material from tailing piles, for $151.80. Six thousand feet of ditch cost 9 cents per foot. Maintenance, $530; construction, $2,648.24.

Route 25G. Snake River Extension Road (3 miles).—Connects Anvil-Glacier with Snake River and its tributaries. Three tons per day are hauled over this road. Work consisted of general maintenance, and cost $125.06.

Route 25H. Otter Creek Road (1.25 miles).—Connects Nome-Fort Davis Road with Otter Creek and vicinity. Has not been used for three years and no work done.

Route 25. Bull Creek Bridge.—Crossing Bull Creek, which is on the trail from the coast to Sunset Creek. Cost of repairs, $68.25.

Route 25. Snake River Bridge.—Work consisted of hauling and placing 40 cubic yards of rock around center pier; $99.38.

Route 26. Candle-Candle Creek Road (9 miles).—Connects Candle with Candle Creek camps. Estimated 1,000 tons hauled during summer and winter. Work consisted of laying 10,150 feet of willow corduroy, which was covered with material plowed and scraped from near the road bed, at 28 cents per linear foot. In addition, 1,005 cubic yards of gravel were hauled at $1.67 per cubic yard; 7,540 feet of ditch was constructed at 2 cents per foot; twenty-five 2 by 2 feet culverts 16 feet long were constructed for $13.70 each; 3,382 bundles of willows were bound in bundles of approximately 50 pounds each and delivered along the right of way. Maintenance, $849.91; construction, $5,013.65.

Route 27. Deering-Inmachuck Road (25 miles).—Connects Deering with Inmachuck River points and supplies the Inmachuck River and its tributaries. Approximately 800 tons were hauled over this road during the year. Road turned over to Territorial road commission, who expended $1,500 during the past year for maintenance.

Route 28. Dahl Creek-Candle Trail (140 miles).—This is a permanently staked trail running from Dahl Creek in the Kougarok district to Candle, a distance of 140 miles. The work consisted of straightening and replacing broken and missing stakes at a cost of $150.

Route 42. St. Michael-Kotlik Trail (70 miles).—Follows along coast between St. Michael and Kotlik. General maintenance cost $350.

Route 49. Davidsons Landing-Taylor Creek Road (40 miles, 24 constructed).—This road runs from Davidsons Landing, the end of water navigation, to Taylor Creek. It is estimated that from 800 to 1,000 tons are hauled over this road yearly. No expenditures were made during the year.

Fortuna Ledge, or Marshall City Road (4½ miles).—Freight is landed from river steamers at Fortuna Ledge and transferred by boats of lighter draft a distance of 12 miles to the upper landing. The road is constructed from the landing to Willow Creek mines. Four hundred tons of freight were hauled over road during the past year. The sum of $4,662.50 was expended by the Alaska road commission in the spring of 1917, the work being paid for in July of that year. The work consisted of getting out and piling on the right of way 9,000 poles and 1,000 stringers for corduroy. The road was later turned over to and completed by the territorial road commission, at a cost of $10,232.44.

Flagging trails.—Each year approximately 550 miles of trail, in addition to those permanently marked, are staked after snow has fallen. This is necessary for the guidance and safety of winter travel. About 100 miles of trail to different camps and creeks are staked by freighters and interested parties with flag lath furnished by the commission. These last trails vary each year according to the work going on in the different localities. The total cost of work during the past winter, including expenses of inspection trips by superintendent, was $4,490.70.

Nome office.—The sum of $249.50 was expended on the office building. The work consisted of raising and leveling building, papering, painting, and the purchase of linoleum for the floor.

STATEMENT OF RECEIPTS AND DISBURSEMENTS.

This report covers vouchers received and placed in the account including June 30, 1918:

Balance on hand July 1, 1917	$29, 797. 53
Received from Treasurer of the United States:	
Appropriation "Construction and maintenance of military and post roads, bridges and trails, Alaska, 1918–19"	325, 000. 00
Alaska fund	256, 000. 00
Correction of vouchers:	
Alaska fund	. 10
Special appropriation	28. 11
Sales of property, Alaska fund	5, 308. 23
Total	616, 133. 97
Deposited to credit Treasurer of the United States	28. 11
	616, 105. 86
Disbursed as per tabulated statement below	597, 020. 18
Balance on hand	19, 085. 68

EXPENDITURES IN DETAIL.

	Construction.	Maintenance.	Total.
Offices	$7, 108. 20	$6, 055. 14	$13, 163. 34
Route 1		88. 50	88. 50
Route 2	7, 910. 00	4, 290. 52	12, 200. 52
Route 2A	1, 200. 00	15, 174. 51	16, 374. 51
Route 3		8, 398. 73	8, 398. 73
Route 4A		1, 341. 50	1, 841. 50
Route 4B, first section	20, 500. 00	33, 697. 87	16, 864. 66
Route 4B, second section			18, 800. 00
Route 4B, third section			18, 533. 21
Route 4C	3, 450. 00	7, 535. 18	10, 985. 18
Route 4D, first section	7, 050. 00	19, 654. 26	13, 372. 10
Route 4D, second section			13, 332. 16
Route 4E	15, 000. 00	4, 064. 17	19, 064. 17
Route 4F		11, 517. 54	11, 517. 54
Route 4G	9, 705. 16	4, 280. 00	13, 985. 16
Route 4H first section	22, 101. 00	20, 660. 00	14, 200. 31
Route 4H, second section			13, 900. 00
Route 4H, third section			14, 660. 69
Route 4I	2, 006. 83	8, 470. 00	10, 476. 83
Route 4J, first section	22, 172. 98	6, 680. 41	13, 903. 13
Route 4J, second section			14, 950. 26
Route 4K, first section	43, 805. 71	5, 400. 71	15, 330. 65
Route 4K, second section			17, 450. 79
Route 4K, third section			16, 424. 98
Tazlina Bridge	956. 01		956. 01
Route 5		470. 08	470. 08
Route 6A		2, 832. 51	2, 832. 51
Route 6B, first section	13, 750. 00	10, 280. 55	12, 532. 25
Route 6B, second section			11, 498. 30
Route 7D	10, 535. 91		10, 535. 91
Route 8		5, 262. 58	5, 262. 58
Route 9		1, 434. 00	1, 434. 00
Route 10	2, 281. 75	8, 295. 34	10, 577. 09
Route 11B		1, 900. 50	1, 900. 50
Route 11E		99. 50	99. 50
Route 12		5, 972. 19	5, 972. 19
Route 13A		3, 935. 71	3, 935. 71
Route 13B	2, 200. 00	3, 038. 52	5, 238. 52
Route 13C		849. 19	849. 19
Route 13D		202. 20	202. 20
Route 13F	85. 30	824. 41	909. 71
Route 13I		195. 85	195. 85
Route 13J		849. 96	849. 96
Route 13K	6, 315. 47	4, 090. 39	10, 405. 86
Route 14	2, 476. 20		2, 476. 20
Route 15		5, 066. 00	5, 066. 00
Route 16		700. 00	700. 00
Route 17		405. 00	405. 00
Route 18		328. 00	328. 00
Route 20A		253. 59	253. 59
Route 20B		253. 59	253. 59

EXPENDITURES IN DETAIL—continued.

	Construction.	Maintenance.	Total.
Route 20C		$263.79	$263.79
Route 20D	$19,949.52		19,949.52
Route 21		21.50	21.50
Route 22		1,352.82	1,352.82
Route 24		6,480.21	6,480.21
Route 25D		846.33	846.33
Route 25E	3,867.63		3,867.63
Route 25F	2,648.24	530.00	3,178.24
Route 25G		75.06	75.06
Sinrock Ferry		265.40	265.40
Bull Creek Bridge		68.25	68.25
Snake River Bridge		99.38	99.38
Route 26	5,013.65	849.91	5,863.56
Route 28		150.00	150.00
Route 29	2,669.02	330.98	3,000.00
Route 30		1,678.88	1,678.88
Route 35, first section	300.00	11,398.46	11,698.46
Route 35, second section	975.00	10,022.93	10,997.93
Route 38A, first section	37,217.70	6,868.78	12,140.51
Route 38A, second section			14,500.00
Route 38A, third section			17,445.97
Route 38B		10.00	10.00
Route 39		4,270.74	4,270.74
Route 40		659.00	659.00
Route 42		350.00	350.00
Route 44		1,966.63	1,966.63
Route 45		5,049.55	5,049.55
Fairbanks Bridge	1,448.03		1,448.03
Flagging Trails		4,490.70	4,490.70
Kahiltna Bridge		347.10	347.10
Mile 26½ Road	7,906.69		7,906.69
Archangel Road	1,134.00	1,133.35	2,267.35
Marshall Road	4,662.50		4,662.50
Iliamna Road	6,781.52		6,781.52
Matanuska Bridge	20,471.32		20,471.32
Kuskulana Bridge	302.15		302.15
Stikine River Trail	1,999.72		1,999.72
Talkeetna-Cache Creek Trail	4,634.52		4,634.52
Total	322,591.73	274,428.45	597,020.18

DISTRIBUTION OF EXPENDITURES.

Salaries (superintendents and clerks)	$25,325.07
Wages (all other labor)	305,222.10
Transportation (persons)	3,423.17
Transportation (freight)	15,730.79
Hire of animals (horses and dogs)	41,700.06
Subsistence (person, meals, and beds)	16,898.73
Provisions (all food supplies)	57,470.36
Forage and care of animals (horseshoeing, veterinary supplies)	41,105.42
Telegraph, telephone, and postage	943.02
Fuel (coal and wood) and light	1,742.99
Construction material	28,789.78
Equipment, tools, camp equipage, wagons, harness, etc	25,239.24
Stationery and drafting supplies, maps, printing, cleaning, and toilet articles	662.85
Rents (offices, post-office boxes, barns, or equipment)	2,434.51
Motor vehicles, repairs, gas, operation, maintenance	28,750.71
Miscellaneous	1,581.38
Total	597,020.18

APPROPRIATIONS.

Act.	Construction and maintenance military and post roads, bridges, and trails, Alaska.
June 12, 1906	$150,000.00
Mar. 2, 1907	250,000.00
May 11, 1908	250,000.00
Mar. 3, 1909	350,000.00
Mar. 23, 1910	100,000.00
Mar. 3, 1911	150,000.00
Aug. 24, 1912	125,000.00
Mar. 2, 1913	155,000.00
Apr. 27, 1914	125,000.00
Mar. 4, 1915	165,000.00
Aug. 29, 1916	500,000.00
May 2, 1917	500,000.00
Total	2,820,000.00

Receipts from Treasury, United States, account "Alaska fund."

Act of Congress approved Jan. 27, 1905, as amended by an act approved May 14, 1906.	Wagon road, bridges, and trails, Alaska fund.
1905	$28,000.00
1906	80,500.00
1907	128,584.00
1908	117,750.00
1909	145,200.00
1910	125,000.00
1911	155,000.00
1912	152,000.00
1913	228,000.00
1914	166,316.32
1915	171,824.31
1916	164,402.30
1917	50,000.00
1918	256,000.00
Total	1,968,576.93

PREVIOUS PROJECTS.

More extended information relating to previous operations and projects is published in the Annual Reports of the board.

LAWS
AFFECTING THE CORPS OF ENGINEERS, UNITED STATES ARMY.

SIXTY-FIFTH CONGRESS. FIRST SESSION.

April 6, 1917.
[S. J. Res. 1.]
[Pub. Res., No. 1.]

CHAP. 1.—Joint Resolution Declaring that a state of war exists between the Imperial German Government and the Government and the people of the United States and making provision to prosecute the same.

Preamble.

Whereas the Imperial German Government has committed repeated acts of war against the Government and the people of the United States of America: Therefore be it

War with Germany. Declaration of.
Proclamations, p. 6.
President authorized to use Army, Navy, etc., to prosecute.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the state of war between the United States and the Imperial German Government which has thus been thrust upon the United States is hereby formally declared; and that the President be, and he is hereby, authorized and directed to employ the entire naval and military forces of the United States and the resources of the Government to carry on war against the Imperial German Government; and to bring the conflict to a successful termination all of the resources of the country are hereby pledged by the Congress of the United States.

Approved, April 6, 1917.

April 17, 1917.
[H. R. 12.]
[Public, No. 2.]

CHAP. 3.—An Act Making appropriations to supply deficiencies in appropriations for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and prior fiscal years, and for other purposes.

Deficiencies appropriations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in appropriations for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and prior fiscal years, and for other purposes, namely:

* * * * *

District of Columbia.

DISTRICT OF COLUMBIA.

* * * * *

M Street Bridge.

Bridges: The sum of $11,000, or so much thereof as may be necessary, of the appropriation for the replacement of two trusses and floor of the M Street Bridge across Rock Creek, fiscal year nineteen hundred and seventeen, is made available for repairs to the east abutment, the placing of new handrails, and the renewal of the wood flooring of said bridge.

* * * * *

Small parks.

Small parks: For the condemnation of small park areas at the intersection of streets outside the limits of the original city of Washington, fiscal year nineteen hundred and fourteen, $8.60.

* * * * *

Washington Aqueduct.
From water revenues.

Washington Aqueduct: For operation, including salaries of all necessary employees, maintenance, and repair of the Washington Aqueduct and its accessories, including the same objects specified under this head in the District of Columbia appropriation Act for the fiscal year nineteen hundred and seventeen, $10,000, to be paid out of the revenues of the Water Department.

* * * * *

War Department.

WAR DEPARTMENT.

CONTINGENT EXPENSES.

Contingent expenses.

For purchase of professional and scientific books, law books, and so forth, including the same objects specified under this head in the legislative, executive, and judicial appropriation Act for the fiscal year nineteen hundred and seventeen, $10,000.

Stationery.

For stationery for the department and its bureaus and offices, $7,500.

* * * * *

Chief of Engineers.

OFFICE OF CHIEF OF ENGINEERS.

Muskingum River, Ohio.
Refund of rentals.
Vol. 38, p. 637.

For refund of rentals to certain lessees of land and water power on the Muskingum River, Ohio, in accordance with the provisions of the sundry civil appropriation Act, approved August first, nineteen hundred and fourteen, $653.72.

Squares 612, 613, D. C.
Clearing titles.

For extinguishing adverse private claims of title in and to squares six hundred and twelve and six hundred and thirteen, so called, in the city of Washington, District of Columbia, $6,060, one half to be paid out of the revenues of the District of Columbia and one half out of the

United States Treasury: *Provided*, That the amount paid for any one lot shall not exceed the proportion of the whole amount that the area of said lot bears to the whole area of said squares: *Provided further*, That the lands acquired hereunder shall become a part of the park system of the District of Columbia and be under the control of the Chief of Engineers of the United States Army.

Provisos.
Limitation.

Added to park system.

RIVER AND HARBOR WORK.

River and harbor work.

To pay the claims adjusted and settled under section four of the river and harbor appropriation Act approved June twenty-fifth, nineteen hundred and ten, and certified to Congress in House Document Numbered Two thousand and forty of the Sixty-fourth Congress, second session, $363.70.

Damage claims.
Vol. 36, p. 676.

* * * * *

LEGISLATIVE.

Legislative.

* * * * *

Statement of appropriations: The statement of appropriations, and so forth, for the last session of the Sixty-fourth Congress shall include the Army, general deficiency, Military Academy, river and harbor, and sundry civil appropriation Acts as passed at the extraordinary session of the Sixty-fifth Congress; and all other appropriations made at the latter session shall be compiled and published with the statement to be prepared of the appropriation Acts for the second session of the Sixty-fifth Congress.

Statement of appropriations, 2d sess., 64th Congress.
Acts of present session to be included in.

* * * * *

NATIONAL DEFENSE.

National defense.

For the national security and defense, and for each and every purpose connected therewith, to be expended at the discretion of the President, and to be immediately available and to remain available until December thirty-first, nineteen hundred and seventeen, $100,000,000.

At discretion of the President.

* * * * *

AUDITED CLAIMS.

Audited claims.

SEC. 2. That for the payment of the following claims, certified to be due by the several accounting officers of the Treasury Department under appropriations the balances of which have been exhausted or carried to the surplus

Claims certified by accounting officers.

Vol. 18, p. 110. fund under the provisions of section five of the Act of June twentieth, eighteen hundred and seventy-four, and under appropriations heretofore treated as permanent, being for the service of the fiscal year nineteen hundred and fourteen and other years, unless otherwise stated, and Vol. 23, p. 254. which have been certified to Congress under section two of the Act of July seventh, eighteen hundred and eighty-four, as fully set forth in House Document Numbered Two thousand and twenty-eight, reported to the Sixty-fourth Congress, second session, there is appropriated as follows:

* * * * *

CLAIMS ALLOWED BY THE AUDITOR FOR THE WAR DEPARTMENT.

* * * * *

For expenses, California Débris Commission, 13 cents.

For improvement and care of public grounds, District of Columbia, $10.50.

* * * * *

Approved, April 17, 1917.

May 12, 1917.
[H. R. 13.]
[Public, No. 11.]

CHAP. 12.—An Act Making appropriations for the support of the Army for the fiscal year ending June thirtieth, nineteen hundred and eighteen, and for other purposes.

Army appropriations. *Post*, pp. 185, 355.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and they are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the Army for the year ending June thirtieth, nineteen hundred and eighteen:

Contingencies.

CONTINGENCIES OF THE ARMY: For all contingent expenses of the Army not otherwise provided for and embracing all branches of the military service, including the office of the Chief of Staff: for all emergencies and extraordinary expenses, including the employment of translators and exclusive of all other personal services in the War Department, or any of its subordinate bureaus or offices at Washington, District of Columbia, or in the Army at large, but impossible to be anticipated or classified; to be expended on the approval and authority of the Secretary of War, and for such purposes as he may deem proper, including the payment of a per diem allowance not to exceed $4, in lieu of subsistence, to employees of the War Department traveling on official business out-

Emergencies, etc.

Per diem subsistence.

side of the District of Columbia and away from their designated posts, $50,000.

* * * * *

Observing war operations abroad.

Expenses of military observers abroad: For the actual and necessary expenses of officers of the Army on duty abroad for the purpose of observing operations of armies of foreign States at war, to be paid upon certificates of the Secretary of War that the expenditures were necessary for obtaining military information, $15,000.

Service schools.

Fort Leavenworth, Kans.

Fort Riley, Kans.

Fort Sill, Okla.

Translator.

United States service schools: To provide means for the theoretical and practical instruction at the Army service schools (including the Army Staff College, the Army School of the Line, the Army Field Engineer School, the Army Field Service and Correspondence School for Medical Officers, and the Army Signal School) at Fort Leavenworth, Kansas, the Mounted Service School, at Fort Riley, Kansas, and the School of Fire for Field Artillery and for the School of Musketry, at Fort Sill, Oklahoma, by the purchase of textbooks, books of reference, scientific and professional papers, the purchase of modern instruments and materials for theoretical and practical instruction, employment of temporary, technical, or special services, and for all other absolutely necessary expenses, to be allotted in such proportion as may, in the opinion of the Secretary of War, be for the best interests of the military service. Not exceeding $100 per month may be used for the payment of one translator, to be appointed by the commandant of the Army service schools with the approval of the Secretary of War, $35,350.

* * * * *

Pay of the Army.

PAY OF THE ARMY.

* * * * *

Officers of the line.

OFFICERS OF THE LINE.

Amount.

Provisos.

Pay restriction.

Officers limited to increase of enlistment increments.

Vol. 39, p. 182.

For pay of officers of the line, $12,500,000: *Provided*, That no part of this appropriation shall be paid to any officer of the line of the Army who shall be appointed or promoted in violation of any of the terms next hereinafter specified: That of the whole number of officers of Cavalry, Field Artillery, Coast Artillery Corps, Infantry, and of Engineers serving with the enlisted force of the Corps of Engineers necessary to fill vacancies created or caused in said arms of the service by reason of the second increment, authorized in said arms by Act of Congress approved June third, nineteen hundred and sixteen, not more than one-fourth shall be appointed or promoted until, exclusive of enlisted men belonging to said arms on June thirtieth, nineteen hundred and sixteen. at least one-fourth of the second increment of enlisted men authorized for said arms by said Act shall have been enlisted; not more than one-half of said whole number of officers shall be appointed or promoted until at least one-half of said increment of enlisted men shall have been enlisted; and not more than three-fourths of said whole number of officers shall be appointed or promoted until at least three-fourths of said increment of enlisted men shall have been enlisted. And all officers promoted in accordance with the terms of this proviso shall take rank, respectively, from the dates on which their promotions shall have become lawful under the terms of this proviso.

Dates of promotions.
Longevity.
National Defense Act.
Vol. 39, p. 182, amended.

Additional pay to officers for length of service, $2,000,-000: *Provided*, That the first part of the second paragraph of section twenty-four of the Act entitled "An Act for making further and more effectual provision for the national defense, and for other purposes," approved June third, nineteen hundred and sixteen, down to the first proviso in said paragraph, be, and the same is hereby amended to read as follows:

Second lieutenants.
Order of filling vacancies.
Cadets.
Enlisted men.
Militia in service.
Officers' Reserve Corps, etc.
Civil life.

" Vacancies in the grade of second lieutenant created or caused by the increases due to this Act, in any fiscal year shall be filled by appointment in the following order: (First) Of cadets graduated from the United States Military Academy during the preceding fiscal year for whom vacancies did not become available during the fiscal year in which they graduated; (second) under the provisions of existing law of enlisted men, including officers of Philippine Scouts, between the ages of twenty-one and thirty-four years, whose fitness for promotion shall have been determined by competitive examination; and of members, including officers, of the Organized Militia, the National Guard, or Naval Militia, between the ages of twenty-one and thirty-four years who have had at least ninety days actual Federal military service under any call of the President during the calendar year nineteen hundred and sixteen, and whose fitness for promotion shall have been determined by examination; (third) of members of the Officers' Reserve Corps between the ages of twenty-one and twenty-seven years, of distinguished colleges as are now or may hereafter be entitled to preference by general orders of the War Department; and (sixth) of candidates from civil life between the ages of twenty-one and twenty-seven years; and the President is authorized to make the necessary rules and regulations to carry these provisions into effect."

* * * * *

Headquarters of departments, etc.

CLERKS AND MESSENGERS AT HEADQUARTERS OF THE SEVERAL TERRITORIAL DEPARTMENTS, TERRITORIAL DISTRICTS, TACTICAL DIVISIONS AND BRIGADES, AND SERVICE SCHOOLS.

* * * * *

Provisos. Service assignments.

Provided, That said clerks, messengers, and laborers shall be employed and assigned by the Secretary of War to the offices and positions in which they are to serve: *Provided further*, That no clerk, messenger, or laborer at headquarters of tactical divisions, military departments, brigades, service schools, and office of the Chief of Staff shall be assigned to duty in any bureau in the War Department.

Duty in Department forbidden.

* * * * *

CORPS OF ENGINEERS.

Engineer Corps.

Pay of officers of the Corps of Engineers, $482,400.
Additional pay for length of service, $96,455.41.

* * * * *

MISCELLANEOUS.

Miscellaneous.

* * * * *

Officer, buildings and grounds, D. C.

For additional pay to officer in charge of public buildings and grounds at Washington, District of Columbia, $500.

* * * * *

Transportation.

TRANSPORTATION OF THE ARMY AND ITS SUPPLIES: For transportation of the Army and its supplies, including transportation of the troops when moving either by land or water, and of their baggage, including members of the Officers' Reserve Corps, enlisted men of the Enlisted Reserve Corps, and retired enlisted men when ordered to active duty, including the cost of packing and crating; for transportation of recruits and recruiting parties; of applicants for enlistment between recruiting stations and recruiting depots; for travel allowance to enlisted men on discharge; for payment of travel allowance as provided in section one hundred and twenty-six of the Act approved June third, nineteen hundred and sixteen, to enlisted men of the National Guard on their discharge from the service of the United States, and to members of the National Guard who have been mustered into the service of the United States and discharged on account of physical disability; for payment of travel pay to officers of the National Guard on their discharge from the service of the United States, as prescribed in the Act approved March second, nineteen hundred and one; for travel allowance to persons on their discharge from the United States disciplinary barracks or from any place in which they have been held under a sentence of dishonorable discharge and confinement for more than six months,

Travel allowances, etc. Vol. 39, p. 217.

National Guard officers on discharge. Vol. 31, p. 902.

Per diem subsistence.

Payment to land grant roads.

Provisos. Basis of computation.

or from the Government Hospital for the Insane after transfer thereto from such barracks or place, to their homes (or elsewhere as they may elect), provided the cost in each case shall not be greater than to the place of last enlistment; of supplies furnished to the militia for the permanent equipment thereof; of the necessary agents and other employees, including per diem allowances in lieu of subsistence not exceeding $4 for those authorized to receive the per diem allowance; of clothing and equipage and other quartermaster stores from Army depots or places of purchase or delivery to the several posts and Army depots and from those depots to the troops in the field; of horse equipment; of ordnance and ordnance stores, and small arms from the foundries and armories to the arsenals, fortifications, frontier posts, and Army depots; for payment of wharfage, tolls, and ferriages; for transportation of funds of the Army; for the hire of employees; for the payment of Army transportation lawfully due such land-grant railroads as have not received aid in Government bonds (to be adjusted in accordance with the decisions of the Supreme Court in cases decided under such land-grant Acts), but in no case shall more than fifty per centum of full amount of service be paid: *Provided*, That such compensation shall be computed upon the basis of the tariff or lower special rates for like transportation performed for the public at large and shall be accepted as in full for all demands for such service:

Fifty per cent to roads not bond aided.

Full pay to excepted roads.

Provided further, That in expending the money appropriated by this Act a railroad company which has not received aid in bonds of the United States, and which obtained a grant of public land to aid in the construction of its railroad on condition that such railroad should be a post route and military road, subject to the use of the United States for postal, military, naval, and other Government services, and also subject to such regulations as Congress may impose restricting the charge for such Government transportation, having claims against the United States for transportation of troops and munitions of war and military supplies and property over such aided railroads, shall be paid out of the moneys appropriated by the foregoing provision only on the basis of such rate for the transportation of such troops and munitions of war and military supplies and property as the Secretary of War shall deem just and reasonable under the foregoing provision, such rate not to exceed fifty per centum of the compensation for such Government transportation as shall at that time be charged to and paid by private parties to any such company for like and similar transportation; and the amount so fixed to be paid shall be accepted as in full for all demands for such service: *And provided further*, That nothing in the preceding provisos shall be construed to prevent the accounting officers of the Government from making full payment to land-grant railroads for transportation of property or persons where the courts of the United States have held that such property or persons do not come within the scope of the deductions provided for in the land-grant Acts: for the purchase and hire of draft and pack animals in such numbers as are actually required for the service, including reasonable provision for replacing unserviceable animals; for the purchase, hire, operation, maintenance, and repair of such harness, wagons, carts, drays, other vehicles, and motor-propelled and horse-drawn passenger-carrying vehicles, as are required for the transportation of troops and supplies, and for official, military, and garrison purposes; for drayage and cartage at the several depots; for the hire of teamsters and other employees; for the purchase and repair of ships, boats, and other vessels required for the transportation of troops and supplies and for official, military, and garrison purposes; for expenses of sailing public transports and other vessels on the various rivers, the Gulf of Mexico, and the Atlantic and Pacific Oceans, $16,000,000.

Draft and pack animals, etc.

Ships, boats, etc.

Transports.

Provided further, That $75,000 of the appropriation hereby made shall be available for additional pay of employees on harbor boats, quartermaster service, in lieu of subsistence.

Employees on harbor boats.

Provided further, That of the amount herein appropriated not exceeding $15,000 may be used for extraordinary expenses of transportation of West Point cadets to Washington, District of Columbia, to attend inaugural ceremonies, and return, which sum shall be immediately available.

West Point cadets at inauguration.

* * * * *

HORSES FOR CAVALRY, ARTILLERY, AND ENGINEERS: For the purchase of horses of ages, sex, and size as may be prescribed by the Secretary of War for remounts, for officers entitled to public mounts for the Cavalry, Artillery, Signal Corps, and Engineers, the United States Military Academy, service schools, and staff colleges, and for the Indian scouts, and for such Infantry and members of the Medical Department in field campaigns as may be required to be mounted, and the expenses incident thereto, and for the hire of employees: *Provided*, That the number of horses purchased under this appropriation, added to the number now on hand, shall be limited to the actual needs of the mounted service, including reasonable provisions for remounts, and, unless otherwise ordered by the Secretary of War, no part of this appropriation shall be paid out for horses not purchased by contract after competition duly invited by the Quartermaster Corps and an inspection under the direction and authority of the Sec-

Horses. Purchases.

***Provisos.* Limitation.**

Open market purchases.

Standard required.

Polo ponies.

retary of War. When practicable, horses shall be pu chased in open market at all military posts or statio when needed, at a maximum price to be fixed by the S retary of War: *Provided further*, That no part of th appropriation shall be expended for the purchase of a horse below the standard set by Army Regulations fo Cavalry and Artillery horses, except when purchased a remounts or for instruction of cadets at the United Stat Military Academy: *And provided further*, That no pa of this appropriation shall be expended for polo poni except for West Point Military Academy, and such poni shall not be used at any other place, $400,000.

* * * * *

Alaska. Roads, bridges, and trails.

CONSTRUCTION, REPAIR, AND MAINTENANCE, MILITARY AND POST ROADS, BRIDGES, AND TRAILS, ALASKA: For the construction, repair, and maintenance of military and po roads, bridges, and trails, Territory of Alaska, $500,00 to remain available until June thirtieth, nineteen hundred and nineteen.

* * * * *

Engineer Department.

ENGINEER DEPARTMENT.

Incidental expenses of depots.

ENGINEER DEPOTS: For incidental expenses for the depots, including fuel, lights, chemicals, stationery, hardware, machinery, pay of civilian clerks, mechanics, laborers, and other employees, extra-duty pay to soldiers necessarily employed for periods not less than ten days as artificers on work in addition to and not strictly in the line of their military duties, such as carpenters, blacksmiths, draftsmen, printers, lithographers, photographers, engine drivers, telegraph operators, teamsters, wheelwrights, masons, machinists, painters, overseers, laborers; for lumber and materials and for labor for packing and crating engineer supplies; repairs of, and for materials to repair, public buildings, machinery, and instruments, and for unforeseen expenses, $35,000.

Engineer School, Washington, D. C.

Equipment etc.

Incidental expenses.

ENGINEER SCHOOL, WASHINGTON, DISTRICT OF COLUMBIA: Equipment and maintenance of the Engineer School at Washington Barracks, District of Columbia, including purchase and repair of instruments, machinery, implements, models, and materials, for the use of the school and for instruction of engineer troops in their special duties as sappers and miners; for land mining, pontoniering, and signaling; for purchase and binding of professional works and periodicals of recent date treating on military and civil engineering and kindred scientific subjects for the library of the United States Engineer School; for incidental expenses of the school, including chemicals, stationery, hardware, machinery, and boats; for pay of civilian clerks, draftsmen, electricians, mechanics, and laborers; compensation of civilian lecturers and payment of tuition fees of student officers at civil technical institutions; for unforeseen expenses; for travel expenses of officers on journeys approved by the Secretary of War and made for the purpose of instruction: *Provided*, That the traveling expenses herein provided for shall be in lieu of mileage and other allowances; and to provide means for the theoretical and practical instruction at the Engineer School by the purchase of textbooks, books of reference, scientific and professional papers, and for other absolutely necessary expenses, $30.000.

Travel expenses.
Proviso.
In lieu of mileage, etc.
Textbooks, etc.

ENGINEER EQUIPMENT OF TROOPS: For pontoon material, tools, instruments, supplies, and appliances required for use in the engineer equipment of troops, for military surveys, and for engineer operations in the field, including the purchase and preparation of engineer manuals and procurement of special paper for same, and for a reserve supply of above equipment, to be immediately available, $1,174,000.

Equipment of troops.

Provided, That authority is granted for the purchase, maintenance, repair, and operation from this appropriation of not to exceed seventy-eight motorcycles, including those on hand.

Proviso.
Motorcycles.

CIVILIAN ASSISTANTS TO ENGINEER OFFICERS: For services of surveyors, survey parties, draftsmen, photographers, master laborers, and clerks to Engineer officers on the staffs of division, corps, and department commanders, $75,000.

Civilian assistants.

ENGINEER OPERATIONS IN THE FIELD: For expenses incident to military engineer operations in the field, including the purchase of material and a reserve of material for such operations, the construction or rental of storehouses within and outside the District of Columbia, the purchase, operation, maintenance, and repair of horse-drawn and motor-propelled passenger-carrying vehicles, and such expenses as are ordinarily provided for under appropriations for "Engineer depots," "Civilian assistants to engineer officers," and "Maps, War Department," $300,000.

Field operation expenses.

Provided, That the appropriations for "Engineer operations in the field," during the fiscal year nineteen hundred and seventeen, may be used for any of the purposes covered by the appropriation "Engineer operations in the field" in this Act.

Proviso.
Use of prior appropriations.
Vol. 39, p. 641.

CONTINGENCIES, ENGINEER DEPARTMENT, PHILIPPINE ISLANDS: For contingent expenses incident to the operations of the Engineer Department in the Philippine Islands, to be expended at the discretion of the Secretary of War, $4,000.

Contingencies, Philippine Islands.

BUILDINGS, ENGINEER SCHOOL AND POST, WASHINGTON, DISTRICT OF COLUMBIA: For continuing construction of buildings for Engineer School and post at Washington

Engineer School, etc., D. C.
Construction of buildings.

Barracks, District of Columbia, to be immediately available and remain available until expended, $202,500.

Military surveys and maps.
Expenses.

MILITARY SURVEYS AND MAPS: For the execution of topographic or other surveys, the securing of such extra topographic data as may be required, and the preparation and printing of maps required for military purposes, to be immediately available and remain available until December thirty-first, nineteen hundred and eighteen: *Provided*, That the Secretary of War is authorized to secure the assistance, wherever practicable, of the United States Geological Survey, the Coast and Geodetic Survey, or other mapping agencies of the Government in this work, and to allot funds therefor to them from this appropriation, $200,000.

Proviso.
Government offices to assist.

Per diem subsistence out of Washington.

Where the expenses of persons engaged in field work or traveling on official business outside of the District of Columbia and away from their designated posts of duty are chargeable to appropriations of the Engineer Department contained in the Army appropriation Act for the fiscal year nineteen hundred and eighteen, a per diem rate of $4 may be allowed in lieu of subsistence.

* * * * *

Chaplains.
Vol. 39, p. 176, amended.

Provided, That section fifteen of the Act of June third, nineteen hundred and sixteen, entitled "An Act for making further and more effectual provision for the national defense, and for other purposes," be amended so as to read as follows: "The President is authorized to appoint, by and with the advice and consent of the Senate, chaplains in the Army at the rate of not to exceed, including chaplains now in service, one for each regiment of Cavalry, Infantry, Field Artillery, and Engineers, and one for each one thousand two hundred officers and men of the Coast Artillery Corps, with rank, pay, and allowances as now authorized by law."

Appointments authorized.

Preferences omitted.

* * * * *

Civilian employees.
Increased compensation allowed to, receiving not more than $1,800 a year.

Provided further, That, during the fiscal year nineteen hundred and eighteen, all civilian employees in the Military Establishment, including on the lump-sum rolls only those persons who are carried thereon at the close of the fiscal year ending June thirtieth, nineteen hundred and seventeen, shall receive increased compensation at the rate of ten per centum per annum to such employees who receive salaries or wages in such establishment at a rate per annum of less than $1,200, and increased compensation at a rate of five per centum per annum to such employees who receive salaries or wages in such establishment at a rate of not more than $1,800 per annum and not less than $1,200 per annum: *And provided further*, That so much as may be necessary for this purpose is hereby appropriated out of any moneys in the Treasury not otherwise appropriated.

Proviso.
Appropriation for.

Public printing and binding.

Vol. 28, p. 622, amended.

Vol. 34, p. 762, amended.

Provided further, That section eighty-seven of the printing and binding Act, approved January twelfth, eighteen hundred and ninety-five (volume twenty-eight, Revised Statutes, page six hundred and twenty-two), and section two of the act approved June thirtieth, nineteen hundred and six (volume thirty-four, Revised Statutes, page seven hundred and sixty-two), are hereby amended as follows:

Work by private establishments permitted in time of war.

"That in time of actual hostilities the Secretary of War may procure from commercial or other printing establishments, by contract or open market purchase, such printing and binding as may be required for the use of the Army and also for the National Guard of the several States and Territories and of the District of Columbia or other military forces while in the military service of the United States or about to be called into said service, payment for such printing and binding to be made from available appropriations."

* * * * *

Approved, May 12, 1917.

May 18, 1917.
[H. R. 3545.]
[Public, No. 12.]

CHAP. 15.—An Act To authorize the President to increase temporarily the Military Establishment of the United States.

Army emergency increase.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in view of the existing emergency, which demands the raising of troops in addition to those now available, the President be, and he is hereby, authorized—

Maximum strength to be immediately raised, etc.

Vol. 39, p. 182.

Temporary appointments to fill Army vacancies created thereby.

Provisional appointments.

Vol. 39, p. 181.

Termination of.

First. Immediately to raise, organize, officer, and equip all or such number of increments of the Regular Army provided by the national defense Act approved June third, nineteen hundred and sixteen, or such parts thereof as he may deem necessary; to raise all organizations of the Regular Army, including those added by such increments, to the maximum enlisted strength authorized by law. Vacancies in the Regular Army created or caused by the addition of increments as herein authorized which can not be filled by promotion may be filled by temporary appointment for the period of the emergency or until replaced by permanent appointments or by provisional appointments made under the provisions of section twenty-three of the national defense Act, approved June third, nineteen hundred and sixteen, and hereafter provisional appointments under said section may be terminated whenever it is determined, in the manner prescribed by the President, that the officer has not the suitability and fitness requisite for permanent appointment.

National Guard and Reserve, drafted into service.

Second. To draft into the military service of the United States, organize, and officer, in accordance with the pro-

Vol. 39, p. 211.

Term of service.

Proviso.
State designations retained.

visions of section one hundred and eleven of said national defense Act, so far as the provisions of said section may be applicable and not inconsistent with the terms of this Act, any or all members of the National Guard and of the National Guard Reserves, and said members so drafted into the military service of the United States shall serve therein for the period of the existing emergency unless sooner discharged: *Provided*, That when so drafted the organizations or units of the National Guard shall, so far as practicable, retain the State designations of their respective organizations.

Additional 500,000 enlisted men to be raised by draft.

Selection of officers.

Vol. 39, p. 190.

Appointments, etc.

Vol. 32, p. 779.

Provisos.
To correspond with Army.

Changes of typical organizations authorized.

Regimental, retained.

Machine-gun companies.

Third. To raise by draft as herein provided, organize and equip an additional force of five hundred thousand enlisted men, or such part or parts thereof as he may at any time deem necessary, and to provide the necessary officers, line and staff, for said force and for organizations of the other forces hereby authorized, or by combining organizations of said other forces, by ordering members of the Officers' Reserve Corps to temporary duty in accordance with the provisions of section thirty-eight of the national defense Act approved June third, nineteen hundred and sixteen; by appointment from the Regular Army, the Officers' Reserve Corps, from those duly qualified and registered pursuant to section twenty-three of the Act of Congress approved January twenty-first, nineteen hundred and three (Thirty-second Statutes at Large, page seven hundred and seventy-five), from the members of the National Guard drafted into the service of the United States, from those who have been graduated from educational institutions at which military instruction is compulsory, or from those who have had honorable service in the Regular Army, the National Guard, or in the volunteer forces, or from the country at large; by assigning retired officers of the Regular Army to active duty with such force with their rank on the retired list and the full pay and allowances of their grade; or by the appointment of retired officers and enlisted men, active or retired, of the Regular Army as commissioned officers in such forces: *Provided*, That the organization of said force shall be the same as that of the corresponding organizations of the Regular Army: *Provided further*, That the President is authorized to increase or decrease the number of organizations prescribed for the typical brigades, divisions, or army corps of the Regular Army, and to prescribe such new and different organizations and personnel for army corps, divisions, brigades, regiments, battalions, squadrons, companies, troops, and batteries as the efficiency of the service may require: *Provided further*, That the number of organizations in a regiment shall not be increased nor shall the number of regiments be decreased: *Provided further*, That the President in his descretion may organize, officer, and equip for each Infantry and Cavalry brigade three machine-gun companies, and for each Infantry and Cavalry division four machine-gun companies, all in addition to the machine-gun companies comprised in organizations included in such brigades and divisions: *Provided further*, That the President in his discretion may organize for each division one armored motor-car machine-gun company. The machine-gun companies organized under this section shall consist of such commissioned and enlisted personnel and be equipped in such manner as the President may prescribe: *And provided further*, That officers with rank not above that of colonel shall be appointed by the President alone, and officers above that grade by the President by and with the advice and consent of the Senate: *Provided further*, That the President may in his discretion recommission in the Coast Guard persons who have heretofore held commissions in the Revenue-Cutter Service or the Coast Guard and have left the service honorably, after ascertaining that they are qualified for service physically, morally, and as to age and military fitness.

Armored motor-car companies.

Personnel.

Appointment of officers.

Coast Guard. Former officers in, may be recommissioned.

Fourth. The President is further authorized, in his discretion and at such time as he may determine, to raise and begin the training of an additional force of five hundred thousand men organized, officered, and equipped, as provided for the force first mentioned in the preceding paragraph of this section.

Draft of additional 500,000 men for training.

Fifth. To raise by draft, organize, equip, and officer, as provided in the third paragraph of this section, in addition to and for each of the above forces, such recruit training units as he may deem necessary for the maintenance of such forces at the maximum strength.

Recruit training units.

Sixth. To raise, organize, officer, and maintain during the emergency such number of ammunition batteries and battalions, depot batteries and battalions, and such artillery parks, with such numbers and grades of personnel as he may deem necessary. Such organizations shall be officered in the manner provided in the third paragraph of this section, and enlisted men may be assigned to said organizations from any of the forces herein provided for or raised by selective draft as by this Act provided.

Artillery organizations to be raised.

Personnel.

Seventh. The President is further authorized to raise and maintain by voluntary enlistment, to organize, and equip, not to exceed four infantry divisions, the officers of which shall be selected in the manner provided by paragraph three of section one of this Act: *Provided*, That the organization of said force shall be the same as that of the corresponding organization of the Regular Army: *And provided further*, That there shall be no enlistments in said force of men under twenty-five years of age at time of enlisting: *And provided further*, That no such volunteer force shall be accepted in any unit smaller than a division.

Volunteer infantry divisions authorized.

***Provisos.* Organization.**

Enlistment age.

Acceptance limited.

Enlisted men. For Army and National Guard by voluntary enlistment or draft.

SEC. 2. That the enlisted men required to raise and maintain the organizations of the Regular Army and to complete and maintain the organizations embodying the members of the National Guard drafted into the service of the United States, at the maximum legal strength as by this Act provided, shall be raised by voluntary enlistment, or if and whenever the President decides that they can not effectually be so raised or maintained, then by selective draft; and all other forces hereby authorized, except as provided in the seventh paragraph of section one, shall be raised and maintained by selective draft exclusively; but this provision shall not prevent the transfer to any force of training cadres from other forces. Such draft as herein provided shall be based upon liability to military service of all male citizens, or male persons not alien enemies who have declared their intention to become citizens, between the ages of twenty-one and thirty years, both inclusive, and shall take place and be maintained under such regulations as the President may prescribe not inconsistent with the terms of this Act. Quotas for the several States, Territories, and the District of Columbia, or subdivisions thereof, shall be determined in proportion to the population thereof, and credit shall be given to any State, Territory, District, or subdivision thereof, for the number of men who were in the military service of the United States as members of the National Guard on April first, nineteen hundred and seventeen, or who have since said date entered the military service of the United States from any such State, Territory, District, or subdivision, either as members of the Regular Army or the National Guard. All persons drafted into the service of the United States and all officers accepting commissions in the forces herein provided for shall, from the date of said draft or acceptance, be subject to the laws and regulations governing the Regular Army, except as to promotions, so far as such laws and regulations are applicable to persons whose permanent retention in the military service on the active or retired list is not contemplated by existing law, and those drafted shall be required to serve for the period of the existing emergency unless sooner discharged: *Provided*, That the President is authorized to raise and maintain by voluntary enlistment or draft, as herein provided, special and technical troops as he may deem necessary, and to embody them into organizations and to officer them as provided in the third paragraph of section one and section nine of this Act. Organizations of the forces herein provided for, except the Regular Army and the divisions authorized in the seventh paragraph of section one, shall, as far as the interests of the service permit, be composed of men who come, and of officers who are appointed from, the same State or locality.

Other forces by draft.

Basis of draft.

Determination of quotas.

Credits allowed for men in service.

Forces subject to Army laws, etc.

Promotions excepted.

Period of service.

Proviso.

Special and technical troops.

Local origin of forces to be considered.

Bounty and substitute prohibitions.

SEC. 3. No bounty shall be paid to induce any person to enlist in the military service of the United States; and no person liable to military service shall hereafter be permitted or allowed to furnish a substitute for such service; nor shall any substitute be received, enlisted, or enrolled in the military service of the United States; and no such person shall be permitted to escape such service or to be discharged therefrom prior to the expiration of his term of service by the payment of money or any other valuable thing whatsoever as consideration for his release from military service or liability thereto.

* * * * *

Registration.
Ages liable.
Presentation for, on notice given by proclamation, etc.
Proclamations, p. 20.
Personal notice inferred.
Punishment for not registering.
Provisos.
Precedence for trials.
Age extent defined.
Registration by mail.

SEC. 5. That all male persons between the ages of twenty-one and thirty, both inclusive, shall be subject to registration in accordance with regulations to be prescribed by the President; and upon proclamation by the President or other public notice given by him or by his direction stating the time and place of such registration it shall be the duty of all persons of the designated ages, except officers and enlisted men of the Regular Army, the Navy, and the National Guard and Naval Militia while in the service of the United States, to present themselves for and submit to registration under the provisions of this Act; and every such person shall be deemed to have notice of the requirements of this Act upon the publication of said proclamation or other notice as aforesaid given by the President or by his direction; and any person who shall willfully fail or refuse to present himself for registration or to submit thereto as herein provided, shall be guilty of a misdemeanor and shall, upon conviction in the district court of the United States having jurisdiction thereof, be punished by imprisonment for not more than one year, and shall thereupon be duly registered: *Provided*, That in the call of the docket precedence shall be given, in courts trying the same, to the trial of criminal proceedings under this Act: *Provided further*, That persons shall be subject to registration as herein provided who shall have attained their twenty-first birthday and who shall not have attained their thirty-first birthday on or before the day set for the registration, and all persons so registered shall be and remain subject to draft into the forces hereby authorized, unless exempted or excused therefrom as in this Act provided: *Provided further*, That in the case of temporary absence from actual place of legal residence of any person liable to registration as provided herein such registration may be made by mail under regulations to be prescribed by the President.

Utilization of departments, officers, etc.

SEC. 6. That the President is hereby authorized to utilize the service of any or all departments and any or all officers or agents of the United States and of the sev-

Duty compulsory.
Authority conferred.
Use of franks.
Offenses designated.
Failure to act.
Making false registrations, etc.
Making false statements, etc.
Neglect of duty, etc.
Punishment.

eral States, Territories, and the District of Columbia, and subdivisions thereof, in the execution of this Act, and all officers and agents of the United States and of the several States, Territories, and subdivisions thereof, and of the District of Columbia, and all persons designated or appointed under regulations prescribed by the President whether such appointments are made by the President himself or by the governor or other officer of any State or Territory to perform any duty in the execution of this Act, are hereby required to perform such duty as the President shall order or direct, and all such officers and agents and persons so designated or appointed shall hereby have full authority for all acts done by them in the execution of this Act by the direction of the President. Correspondence in the execution of this Act may be carried in penalty envelopes bearing the frank of the War Department. Any person charged as herein provided with the duty of carrying into effect any of the provisions of this Act or the regulations made or directions given thereunder who shall fail or neglect to perform such duty; and any person charged with such duty or having and exercising any authority under said Act, regulations, or directions, who shall knowingly make or be a party to the making of any false or incorrect registration, physical examination, exemption, enlistment, enrollment, or muster; and any person who shall make or be a party to the making of any false statement or certificate as to the fitness or liability of himself or any other person for service under the provisions of this Act, or regulations made by the President thereunder, or otherwise evades or aids another to evade the requirements of this Act or of said regulations, or who, in any manner, shall fail or neglect fully to perform any duty required of him in the execution of this Act, shall, if not subject to military law, be guilty of a misdemeanor, and upon conviction in the district court of the United States having jurisdiction thereof, be punished by imprisonment for not more than one year, or, if subject to military law, shall be tried by court-martial and suffer such punishment as a court-martial may direct.

Voluntary enlistments.
Qualifications, etc.
Period.
Enlistments in force continued through emergency.

SEC. 7. That the qualifications and conditions for voluntary enlistment as herein provided shall be the same as those prescribed by existing law for enlistments in the Regular Army, except that recruits must be between the ages of eighteen and forty years, both inclusive, at the time of their enlistment; and such enlistments shall be for the period of the emergency unless sooner discharged. All enlistments, including those in the Regular Army Reserve, which are in force on the date of the approval of this Act and which would terminate during the emergency shall continue in force during the emergency unless sooner discharged; but nothing herein contained shall be construed to shorten the period of any existing enlistment: *Provided*, That all persons enlisted or drafted under any of the provisions of this Act shall as far as practicable be grouped into units by States and the political subdivisions of the same: *Provided further*, That all persons who have enlisted since April first, nineteen hundred and seventeen, either in the Regular Army or in the National Guard, and all persons who have enlisted in the National Guard since June third, nineteen hundred and sixteen, upon their application, shall be discharged upon the termination of the existing emergency.

Provisos. Geographical units.

Discharges allowed at end of emergency.

The President may provide for the discharge of any or all enlisted men whose status with respect to dependents renders such discharge advisable; and he may also authorize the employment on any active duty of retired enlisted men of the Regular Army, either with their rank on the retired list or in higher enlisted grades, and such retired enlisted men shall receive the full pay and allowances of the grades in which they are actively employed.

Enlisted men. Discharges to support family.

Active duty for retired enlisted men.

SEC. 8. That the President, by and with the advice and consent of the Senate, is authorized to appoint for the period of the existing emergency such general officers of appropriate grades as may be necessary for duty with brigades, divisions, and higher units in which the forces provided for herein may be organized by the President, and general officers of appropriate grade for the several Coast Artillery districts. In so far as such appointments may be made from any of the forces herein provided for, the appointees may be selected irrespective of the grades held by them in such forces. Vacancies in all grades in the Regular Army resulting from the appointment of officers thereof to higher grades in the forces other than the Regular Army herein provided for shall be filled by temporary promotions and appointments in the manner prescribed for filling temporary vacancies by section one hundred and fourteen of the national defense Act approved June third, nineteen hundred and sixteen; and officers appointed under the provisions of this Act to higher grades in the forces other than the Regular Army herein provided for shall not vacate their permanent commissions nor be prejudiced in their relative or lineal standing in the Regular Army.

General officers for emergency.

Post, p. 410.

For Coast Artillery.

Selection of appointees.

Filling resulting vacancies in the Army.

Vol. 39, p. 211.

Permanent status retained.

SEC. 9. That the appointments authorized and made as provided by the second, third, fourth, fifth, sixth, and seventh paragraphs of section one and by section eight of this Act, and the temporary appointments in the Regular Army authorized by the first paragraph of section one of this Act, shall be for the period of the emergency, unless sooner terminated by discharge or otherwise. The President is hereby authorized to discharge any officer from the office held by him under such appointment for any cause which, in the judgment of the President, would promote the public service; and the general commanding any division and higher tactical organization or terri-

Appointments to be for emergency period.

Discharges for cause.

Examination boards to act on qualifications, etc.

Discharges if recommended.

torial department is authorized to appoint from time to time military boards of not less than three nor more than five officers of the forces herein provided for to examine into and report upon the capacity, qualification, conduct, and efficiency of any commissioned officer within his command other than officers of the Regular Army holding permanent or provisional commissions therein. Each member of such board shall be superior in rank to the officer whose qualifications are to be inquired into, and if the report of such board be adverse to the continuance of any such officer and be approved by the President, such officer shall be discharged from the service at the discretion of the President with one month's pay and allowances.

Equality of pay, etc., declared.

Pay of enlisted men increased during emergency.

Proviso. Not credited to service pay.

SEC. 10. That all officers and enlisted men of the forces herein provided for other than the Regular Army shall be in all respects on the same footing as to pay, allowances, and pensions as officers and enlisted men of corresponding grades and length of service in the Regular Army; and commencing June one, nineteen hundred and seventeen, and continuing until the termination of the emergency, all enlisted men of the Army of the United States in active service whose base pay does not exceed $21 per month shall receive an increase of $15 per month: those whose base pay is $24, an increase of $12 per month; those whose base pay is $30, $36, or $40, an increase of $8 per month; and those whose base pay is $45 or more, an increase of $6 per month: *Provided*, That the increases of pay herein authorized shall not enter into the computation of continuous-service pay.

Restriction on details, etc., suspended.

SEC. 11. That all existing restrictions upon the detail, detachment, and employment of officers and enlisted men of the Regular Army are hereby suspended for the period of the present emergency.

Liquor prohibitions authorized.

Post, p. 393.

Proviso. Sales at posts, etc., forbidden.

Medical allowance.

Sales to men in uniform unlawful.

Punishment for.

SEC. 12. That the President of the United States, as Commander in Chief of the Army, is authorized to make such regulations governing the prohibition of alcoholic liquors in or near military camps and to the officers and enlisted men of the Army as he may from time to time deem necessary or advisable: *Provided*, That no person, corporation, partnership, or association shall sell, supply, or have in his or its possession any intoxicating or spirituous liquors at any military station, cantonment, camp, fort, post, officers' or enlisted men's club, which is being used at the time for military purposes under this Act, but the Secretary of War may make regulations permitting the sale and use of intoxicating liquors for medicinal purposes. It shall be unlawful to sell any intoxicating liquor, including beer, ale, or wine, to any officer or member of the military forces while in uniform, except as herein provided. Any person, corporation, partnership, or association violating the provisions of this section of the regulations made thereunder shall, unless otherwise punishable under the Articles of War, be deemed guilty of a misdemeanor and be punished by a fine of not more than

$1,000 or imprisonment for not more than twelve months, or both.

* * * * *

Suspension of conflicting laws.

SEC. 14. That all laws and parts of laws in conflict with the provisions of this Act are hereby suspended during the period of this emergency.

Approved, May 18, 1917.

May 22, 1917.
[S. 1006.]
[Public, No. 13.]

CHAP. 16.—An Act Authorizing the county of Morrison, Minnesota, to construct a bridge across the Mississippi River in said county.

Mississippi River.
Morrison County, Minn., may bridge.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Morrison, in the State of Minnesota, be, and it is hereby, authorized to construct, maintain, and operate a highway bridge and approaches thereto across the Mississippi River, at a point suitable to the interests of navigation, in section eight, township one hundred and twenty-seven north, range twenty-nine west of the fifth principal meridian, and section thirty-two, township thirty-nine north, range thirty-two west of the fourth principal meridian, in the State of Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Location.
Construction.
Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, May 22, 1917.

May 22, 1917.
[S. 1007.]
[Public, No. 14.]

CHAP. 17.—An Act Authorizing the city of Bemidji, Minnesota, to construct a bridge across the Mississippi River at or near that place.

Mississippi River.
Bemidji, Minn., may bridge.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Bemidji, a corporation organized under the laws of the State of Minnesota, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Mississippi River at a point suitable to the interests of navigation between lots one and two, section sixteen, township one hundred and forty-sixth north, range thirty-three west, fifth principal meridian, in the State of Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction.
Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, May 22, 1917.

May 22, 1917.
[H. R. 2343.]
[Public, No. 16.]

CHAP. 19.—An Act Granting consent to Ernest B. Denison, A. J. Barchfield, and Ethan I. Dodds to construct a bridge across the Wabash River within or near the city limits of the city of Vincennes, Indiana.

Wabash River.
Ernest B. Denison and others may bridge, Vincennes, Ind.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to Ernest B. Denison, A. J. Barchfield, and Ethan I. Dodds, their successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Wabash River at a point suitable to the interests of navigation, within or near the city limits of Vincennes, in the county of Knox, in the State of Indiana, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction.
Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, May 22, 1917.

May 22, 1917.
[S. J. Res. 61.]
[Pub. Res., No. 3.]

CHAP. 21.—Joint Resolution To grant authority for the erection of temporary buildings at the headquarters of the American Red Cross, Washington, District of Columbia.

District of Columbia.
Memorial to Women of the Civil War.
American Red Cross allowed temporary structures on.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That authority be, and is hereby, given to the Commission on Memorial to Women of the Civil War to grant permission, under such conditions and restrictions as it may deem necessary, to the central committee of the American Red Cross to erect upon square numbered one hundred and seventy-two, in the city of Washington, a temporary building or buildings for the use of the American Red Cross in connection with its work in cooperation with the Government of the United States: *Provided,* That any building or buildings which may be erected under this authority shall be removed and the site or sites thereof placed in good condition within three years from the date of the approval of this resolution, unless otherwise especially provided by Congress: *Provided further,* That the United States shall be put to no expense of any kind by reason of the exercise of the authority hereby conferred.

Provisos.
Removal, etc.
No expense authorized.

Approved, May 22, 1917.

May 29, 1917.
[H. R. 14.]

[Public, No. 18.]

Military Academy appropriations.

CHAP. 22.—An Act Making appropriations for the support of the Military Academy for the fiscal year ending June thirtieth, nineteen hundred and eighteen, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the Military Academy for the fiscal year ending June thirtieth, nineteen hundred and eighteen:

PERMANENT ESTABLISHMENT.

Permanent establishment.

* * * * *

For pay of one professor of practical military engineering (lieutenant colonel), in addition to pay as major, $500;

* * * * *

Enlisted men.

For pay of the Military Academy band, field musicians, general Army service, Cavalry, Artillery, and Engineering detachment, and enlisted men on detached service, and extra pay for enlisted men on special duty:

Academy band.

For pay of one band sergeant and assistant leader, $900;

Twelve enlisted musicians, at $45 per month, $6,480;

Twelve enlisted musicians, at $36 per month, $5,184;

Sixteen enlisted musicians, at $30 per month, $5,760;

Additional pay for length of service, $5,124.

* * * * *

Engineer detachment.

For pay of Engineer detachment: One first sergeant, at $45 per month, $540;

One quartermaster sergeant, at $36 per month, $432;

Eight sergeants, at $36 each per month. $3,456;

Ten corporals, at $24 each per month, $2,880;

Two cooks, at $30 each per month, $720;

Two musicians, at $15 each per month, $360;

Thirty-eight privates, first class, and thirty-eight privates, $15,080;

For additional pay of one sergeant in charge of detachment mess, at $6 per month, $72;

Additional pay for length of service, $8,604.

* * * * *

For extra pay of one enlisted man on duty in charge of engineer property and fatigue, at 50 cents per day, $156.50.

For extra pay of one enlisted man as clerk in the department of practical military engineering and to the officer in charge of waterworks and works of construction at the Military Academy, at 50 cents per day, $156.50.

* * * * *

For extra pay of one teamster (engineer soldier) employed in the department of practical military engineering, in connection with the water supply and on works of construction, at 35 cents per day, $127.75.

* * * * *

Pay of civilians.

PAY OF CIVILIANS.

* * * * *

For pay of one draftsman in department of civil and military engineering, $1,200.

* * * * *

Department of civil and military engineering.

For department of civil and military engineering: For models, maps, purchase and repair of instruments, apparatus, drawing boards, desks, chairs, shelves, and cases for books and instruments, textbooks, books of reference, and stationery for the use of instructors, and contingencies, $1,200.

* * * * *

Department of practical military engineering.

For department of practical military engineering: For models, books of reference, scientific periodicals, and stationery; for purchase and repair of instruments, materials, and apparatus for use in instructing cadets in surveying, reconnoissance, signaling and field telegraphy, military field engineering, and field fortification; for photographic and lithographic apparatus and materials for field photography and map production; tools and materials for maintenance of the batteries of the academy; transportation of field parties; for extra-duty pay of engineer soldiers at 50 cents per day each when employed as assistants in photographic laboratory or as special skilled mechanics in the department, and for contingent expenses not otherwise provided for, $3,500.

* * * * *

Approved, May 29, 1917.

June 9, 1917.
[H. J. Res. 94.]

[Pub. Res., No. 5.]

CHAP. 25.—Joint Resolution Authorizing the Board of Regents of the Smithsonian Institution to permit the Secretary of War to erect temporary buildings in the Smithsonian Grounds.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That authority be, and is hereby, given to the Board of Regents of the Smithsonian Institution to grant permission, under such conditions and restrictions as they may deem necessary, to the Secretary of War to erect for the use of the War Department a temporary structure or structures in the Smithsonian Grounds in the city of Washington: *Provided*, That the Secretary of War shall have such building or buildings removed from the said grounds and the site or sites thereof placed in as good condition as at present within three years from the date of the approval of this resolution.

Smithsonian Institution.
Temporary structures for Army allowed in grounds of.

Proviso.
Removal, etc., within three years.

Approved, June 9, 1917.

June 12, 1917.
[H. R. 11.]
Public, No. 21.

CHAP. 27.—An Act Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and eighteen, and for other purposes.

Sundry civil expenses appropriations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the fiscal year ending June thirtieth, nineteen hundred and eighteen, namely:

* * * * *

Rock Creek and Potomac Parkway Commission.

ROCK CREEK AND POTOMAC PARKWAY COMMISSION.

Acquiring connecting lands.
Vol. 37, p. 885.

To enable the commission created by section twenty-two of the public buildings Act approved March fourth, nineteen hundred and thirteen (Thirty-seventh Statutes at Large, page eight hundred and eighty-five), to continue proceedings toward the acquisition of lands required for a connecting parkway between Potomac Park, the Zoological Park, and Rock Creek Park, $100,000, together with the unexpended balance of the appropriation for this purpose for the fiscal year nineteen hundred and seventeen, to be available until expended and to be payable one-half out of the Treasury of the United States and one-half out of the revenues of the District of Columbia: *Provided*, That the total area of lands finally to be acquired for said parkway shall not exceed the area and parcels described and delineated in the map numbered two, contained in House Document Numbered Eleven hundred and fourteen of the Sixty-fourth Congress, first session: *Provided further*, That the expenditure of the funds appropriated herein shall be subject to all the conditions imposed by the sundry civil appropriation Act approved July first, nineteen hundred and sixteen.

Half from District revenues.
Provisos.
Area limited.
Conditions imposed.
Vol. 39, p. 282.

* * * * *

Ericsson memorial.

ERICSSON MEMORIAL COMMISSION.

Erection in Washington, D. C.
Vol. 39, p 671.

For the erection in the city of Washington, District of Columbia, of a suitable memorial to John Ericsson, in accordance with the provisions of the Act entitled "An Act for erecting a suitable memorial to John Ericsson," approved August thirty-first, nineteen hundred and sixteen, $35,000; and in addition to the foregoing amount, the commission is authorized to accept and to expend such sums as may be donated for the memorial.

Acceptance of donations for.

War Department.

WAR DEPARTMENT.

Military publications.

MILITARY PUBLICATIONS.

Printing and binding instruction manuals, etc.

Proviso.
Private contracts permitted.

In addition to any other appropriation available for this purpose, there is hereby appropriated $150,000, or so much thereof as may be necessary, to be immediately available, to be expended in printing and binding publications and manuals necessary for the organization and instruction of the land forces of the United States or such other necessary printing as the Secretary of War may prescribe: *Provided*, That the printing and binding herein authorized may be executed under contract with private concerns if in the judgment of the Secretary of War the public interest requires, notwithstanding the provisions of law requiring such printing and binding to be done in the Government Printing Office.

* * * * *

Engineer Department.

ENGINEER DEPARTMENT.

Flood control of the Mississippi, etc.
Vol. 39, p. 948.

For prosecuting work of flood control in accordance with the provisions of the flood-control Act approved March first, nineteen hundred and seventeen, $6,000,000.

Yellowstone Park.
Improvements.

Proviso.
Snow restriction.

Yellowstone National Park: For maintenance and repair of improvements $147,500, including not to exceed $5,000 for maintenance of the road in the forest reserve leading out of the park from the east boundary, and not to exceed $7,500 for maintenance of the road in the forest reserve leading out of the park from the south boundary, and including not exceeding $3,000 for purchase, operation, maintenance, and repair of motor-driven and horse-drawn, passenger-carrying vehicles to be used for inspection of roads and road work, to be expended by and under the direction of the Secretary of War: *Provided*, That no portion of this appropriation shall be expended for the removal of snow from any of the roads for the purpose of opening them in advance of the time when they will be cleared by seasonal changes.

Resurfacing belt line.

For resurfacing and for finishing the belt line with oil macadam, $20,000.

Crater Lake Park.
Roads, etc.

Crater Lake National Park, Oregon: For continuation of a wagon road and the necessary bridges through the park, together with a system of tanks and water-supply pipes for sprinkling, in accordance with the recommendations in House Document Numbered Three hundred and twenty-eight, Sixty-second Congress, second session, and for maintenance, repair, and operation of two horse-drawn passenger-carrying vehicles, to be expended under the direction of the Secretary of War, $50,000.

Buildings and grounds, D. C.
Improvement and care.

Buildings and grounds in and around Washington: For improvement and care of public grounds, District of Columbia, as follows:

For improvement and maintenance of grounds south of Executive Mansion, $4,000.

For ordinary care of greenhouses and nursery, $2,000.

For repair and reconstruction of the greenhouses at the nursery, $3,000.

For ordinary care of Lafayette Park, $2,000.

For ordinary care of Franklin Park, $1,500.

For improvement and ordinary care of Lincoln Park, $2.000.

Monument Grounds.

For care and improvement of Monument Grounds and annex, $7,000.

For improvement, care, and maintenance of Garfield Park, $2,500.

General repairs, etc.

For construction and repair of post-and-chain fences, repair of high iron fences, constructing stone coping about reservations, painting watchmen's lodges, iron fences, vases, lamps, and lamp-posts; repairing and extending water pipes, and purchase of apparatus for cleaning them; hose, manure, and hauling the same; removing snow and ice; purchase and repair of seats and tools; trees, tree and plant stakes, labels, lime, whitewashing, stock for nursery, flowerpots, twine, baskets, wire, splints, and moss, to be purchased by contract or otherwise, as the Secretary of War may determine; care, construction, and repair of fountains; abating nuisances; cleaning statues and repairing pedestals, $18,550.

Improvements, etc.

For improvement, care, and maintenance of various reservations, including maintenance, repair, exchange, and operation of one horse-drawn and two motor-propelled passenger-carrying vehicles to be used only for official purposes, $30,000.

For improvement, care, and maintenance of Smithsonian grounds. $3,000.

For improvement and maintenance of Judiciary Park, $2,500.

For laying cement and other walks in various reservations, $2,000.

For broken-stone road covering for parks, $3,500.

For curbing, coping, and flagging for park roads and walks. $2.000.

Potomac Park.

For care and maintenance of Potomac Park, $15,000.

For grading, soiling, seeding, and planting that portion of Potomac Park west of the railroad embankment, and constructing paths, $25,000.

For oiling or otherwise treating macadam roads, $4,000.

For care and improvement of the portion of Potomac Park east of the railroad embankment, $50,000.

For continuing the improvement of Montrose Park, and for its care and maintenance, $5,000.

Outdoor sports.

For placing and maintaining special portions of the parks in condition for outdoor sports, $10,000.

Meridian Hill Park.

To continue construction of necessary retaining walls in Meridian Hill Park, and grading incident thereto, $50,000.

For care and maintenance of Willow Tree Park, $1,500.

For improving the site of the old high-service reservoir, at the southeast corner of Wisconsin Avenue and R Street northwest, $5,000.

Sea wall, Potomac Park.

For continuing moving out the sea wall on the river side of west Potomac Park, $22,500.

For care of the center parking on Maryland Avenue northeast, $1,000.

Field house, Potomac Park.

For continuing a field house in East Potomac Park, east of the railroad embankment, $50,000.

For operation, care, repair, and maintenance of the pumps which operate the three fountains in the Union Station Plaza, $4,000.

For constructing and erecting a wagon shed at the propagating gardens, $7,000.

Increased pay to laborers.

To provide for an increase of fifteen per centum in the pay of park laborers, $15,000.

Judiciary Park.

For new road pavements, curbs, gutters, and sidewalks on the E and F Street roadways through Judiciary Park, $15,000.

For improving small triangles, $2,500.

For planting the center parking in Pennsylvania Avenue between Second and Seventeenth Streets southeast, $5,000.

For new public comfort station in Willow Tree Park, $3,500.

Tidal Basin, Potomac Park.

Public bathing beach to be established on.

TIDAL BASIN BATHING BEACH: The Chief of Engineers of the United States Army is authorized and directed to establish and maintain at a suitable place upon the shore of the Tidal Basin, in Potomac Park, a public bathhouse, with the necessary equipment, with a sloping sandy beach in the Tidal Basin, and to install a proper equipment to purify the water entering the basin so that it will not endanger the health of those bathing in it. The direction and control of said public bathing facilities shall be vested in the Chief of Engineers of the United States Army, who shall prescribe such regulations for their use as may be necessary to insure the greatest benefit to the public: *Provided*, That no charge shall be made for the use of the bathhouse or beach, except that uniform fees may be collected for the hire of bathing suits, soap, towels, and such other conveniences as may be provided upon the request of persons desiring to use them. To enable the Chief of Engineers to begin construction of the bathhouse, beach, and purification plant herein provided for, $35,000, to be immediately available; and the limit of cost of such construction shall not exceed that amount.

Control, etc.

Proviso. Restriction on fees, etc.

Construction.

Half from District revenues.

One half of the foregoing sums under "Buildings and grounds in and around Washington" shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States.

Limit for asphalt pavements.

Under appropriations contained in this Act no contract shall be made for making or relaying sheet asphalt or asphalt block pavement at a higher price than $1.80 per square yard for a quality equal to the best laid in the District of Columbia during the years nineteen hundred and fourteen to nineteen hundred and seventeen, inclusive, and with same depth of base: *Provided*, That these conditions as to price and depth of base shall not apply to those streets on which, in the judgment of the Chief of Engineers, by reason of heavy traffic, poor foundation, or other causes, a pavement of more than ordinary strength is required, in which case the limit of price may be increased to $2 per square yard.

Proviso.
Heavy traffic allowance.

Grounds of executive departments, etc.

For improvement, care, and maintenance of grounds of executive departments, $1,000.

For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Library of Congress as may be requested by the superintendent of the Library Buildings, $1,000.

For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Capitol and the Senate and House Office Buildings as may be requested by the Superintendent of the Capitol Building, $4,000.

Executive Mansion grounds.

For improvement and maintenance of Executive Mansion grounds (within iron fence), $5,000.

Engineer.

For the employment of an engineer by the officer in charge of public buildings and grounds, $2,400.

For purchase and repair of machinery and tools for shops at nursery, and for the repair of shops and storehouses, $1,000.

Executive Mansion.
Care, etc.

Executive Mansion: For ordinary care, repair, and refurnishing of Executive Mansion, and for purchase, maintenance, and driving of horses and vehicles for official purposes, to be expended by contract or otherwise, as the President may determine, $35,000.

Extraordinary repairs, etc.

For extraordinary repairs and refurnishing of Executive Mansion, $60,000.

Fuel.

For fuel for the Executive Mansion and greenhouses, $6,000.

Greenhouses.

For care and maintenance of greenhouses, Executive Mansion, $9,000.

For repair to greenhouses, Executive Mansion, $3,000.

Traveling expenses of the President.

For traveling expenses of the President of the United States, to be expended in his discretion and accounted for on his certificate solely, $25,000.

Lighting.

For lighting the Executive Mansion, grounds, and greenhouses, including all necessary expenses of installation, maintenance, and repair, $8,600.

Lighting and heating public grounds.

Lighting the public grounds: For lighting the public grounds, watchmen's lodges, offices, and greenhouses at the propagating gardens, including all necessary expenses of installation, maintenance, and repair, $22,300;

For heating offices, watchmen's lodges, and greenhouses at the propagating gardens, $3,820;

Half from District revenues.

In all, $26,120, or so much thereof as may be necessary, one-half of which sum shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States.

Government telegraph.

Telegraph to connect the Capitol with the departments and Government Printing Office: For care and repair of existing lines, $500.

Washington Monument.

Maintenance salaries.

Washington Monument: For custodian, $1,200; steam engineer, $960; assistant steam engineer, $840; fireman, $660; assistant fireman, $660; conductor of elevator car, $900; attendants—one on floor $720, one on top floor $720; three night and day watchmen, at $720 each; in all, $8,820.

Expenses.

For fuel, lights, oil, waste, packing, tools, matches, paints, brushes, brooms, lanterns, rope, nails, screws, lead, electric lights, heating apparatus, oil stoves for elevator car and upper and lower floors; repairs to engines, boilers, dynamos, elevator, and repairs of all kinds connected with the Monument and machinery; and purchase of all necessary articles for keeping the Monument, machinery, elevator, and electric plant in good order, $3,000.

Sunday opening.

For extra services of employees and for additional supplies and materials, to provide for opening the Monument to the public on Sundays and legal holidays, $2,000.

Building where Abraham Lincoln died.

Building where Abraham Lincoln died: For painting and miscellaneous repairs, $200.

Wakefield, Va.

Birthplace of George Washington, Wakefield, Virginia: For repairs to fences and cleaning up and maintaining grounds about the monument, $100.

Commission of Fine Arts.

Expenses.

Vol. 36, p. 371.

Commission of Fine Arts: For expenses made necessary by the Act approved May seventeenth, nineteen hundred and ten, entitled "An Act establishing a Commission of Fine Arts," including the purchase of periodicals, maps, and books of reference, to be disbursed, on vouchers approved by the commission, by the officer in charge of public buildings and grounds, who shall be the secretary and shall act as the executive officer of said commission, $8,000.

Grant Memorial.

Reappropriation.

Vol. 39, p. 291.

The appropriation of $5,000 made in the sundry civil Act approved August first, nineteen hundred and fourteen, for unveiling and dedicating the memorial to General Ulysses S. Grant, and for each and every purpose connected therewith, including erecting and taking down viewing stands and putting the grounds in sightly condition, is made available for said purposes during the fiscal year nineteen hundred and eighteen.

Lincoln Memorial.

Completing construction.

Lincoln Memorial Commission: For completing the erection of the Lincoln Memorial in accordance with the plans and design and on the location approved by Congress, and for each and every purpose connected therewith, to be immediately available, $331,000.

Aqueduct Bridge, D. C.

Construction.

Vol. 39, p. 163.

Aqueduct Bridge: For continuing the construction of the bridge authorized in section one of an Act entitled "An Act to provide for the removal of what is now known as the Aqueduct Bridge, across the Potomac River, and for the building of a bridge in place thereof," approved May eighteenth, nineteen hundred and sixteen, $100,000, one half to be payable out of the Treasury of the United States and the other half out of the revenues of the District of Columbia.

Half from District revenues.

Rivers and harbors.

Contract work.

Harbors and rivers, contract work: Toward the construction of works on harbors and rivers, under contract and otherwise, and within the limits authorized by law, including horse-drawn and motor-propelled passenger-carrying vehicles required and to be used only for official business, namely:

Vol. 39, pp. 392, 393, 394, 401, 405.

For works authorized by the river and harbor Act of nineteen hundred and sixteen, as follows:

Delaware River.

Philadelphia to the sea.

Delaware River, Pennsylvania and New Jersey: For continuing improvement from Allegheny Avenue, Philadelphia, to the sea, $150,000.

Duluth-Superior Harbor.

Duluth, Minnesota, and Superior, Wisconsin, Harbor: For completing improvement, $180,000.

East River, N. Y.

East River, New York: For continuing improvement, $200,000.

Hudson River, N. Y.

Hudson River, New York: For continuing improvement, $375,000.

Kahului, Hawaii.

Kahului, Hawaii, Harbor: For continuing improvement, $100,000.

Maps.

Maps, War Department: For publication of engineer maps for use of the War Department, inclusive of war maps, $10,000.

Survey of northern and northwestern lakes.

Survey of northern and northwestern lakes: For survey of northern and northwestern lakes, Lake of the Woods, and other boundary and connecting waters between said lake and Lake Superior, Lake Champlain, and the natural navigable waters embraced in the navigation system of the New York canals, including all necessary expenses for preparing, correcting, extending, printing, binding, and issuing charts and bulletins, and of investigating lake levels with a view to their regulation, $125,000.

California Débris Commission.

Vol. 27, p. 507.

California Débris Commission: For defraying the expenses of the commission in carrying on the work authorized by the Act of Congress approved March first, eighteen hundred and ninety-three, $15,000.

New York Harbor.

Preventing injurious deposits.

Harbor of New York: For prevention of obstructive and injurious deposits within the harbor and adjacent water of New York City:

For pay of inspectors, deputy inspectors, and office force, and expenses of office, $10,260;

For pay of crews and maintenance of patrol fleet, six steam tugs and one launch, $75,000;

"Lamont," refitting, etc.

For purchase and installation of a new dynamo, electrical fittings, new deck, and new boiler on patrol vessel Lamont, $11,500;

In all, $96,760.

* * * * *

Back pay and bounty.

BACK PAY AND BOUNTY.

Payment of Civil War.

Vol. 14, p. 322.

Commutation of rations.

For arrears of pay of two and three year volunteers, for bounty to volunteers and their widows and legal heirs, for bounty under the Act of July twenty-eighth, eighteen hundred and sixty-six, and for amounts for commutation of rations to prisoners of war in States of the so-called Confederacy, and to soldiers on furlough, that may be certified to be due by the accounting officers of the Treasury during the fiscal year nineteen hundred and eighteen, $25,000.

War with Spain, etc.

For arrears of pay and allowances on account of service of officers and men of the Army during the War with Spain and in the Philippine Islands that may be certified to be due by the accounting officers of the Treasury during the fiscal year nineteen hundred and eighteen and that are chargeable to the appropriations that have been carried to the surplus fund, $1,000.

* * * * *

Government Printing Office.

GOVERNMENT PRINTING OFFICE.

PUBLIC PRINTING AND BINDING.

* * * * *

Army medical bulletins.

For the War Department, $275,000: *Provided*, That the sum of $3,000, or so much thereof as may be necessary, may be used for the publication, from time to time, of bulletins prepared under the direction of the Surgeon General of the Army, for the instruction of medical officers, when approved by the Secretary of War, and not exceeding $50,000 shall be available for printing and binding under the direction of the Chief of Engineers.

* * * * *

Approved, June 12, 1917.

June 15, 1917.
[H. R. 3971.]

[Public, No. 28.]

CHAP. 29.—An Act Making appropriations to supply urgent deficiencies in appropriations for the Military and Naval Establishments on account of war expenses for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and for other purposes.

Deficiencies appropriations for war expenses, etc.

Post, p. 345.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, to supply urgent deficiencies in appropriations for the Military and Naval Establishments on account of war expenses for the fiscal year ending June thirtieth, nineteen hundred and seventeen, and for other purposes, namely:

* * * * *

WAR DEPARTMENT.

War Department.

For the temporary employment of such additional force of clerks and other employees as in the judgment of the Secretary of War may be proper and necessary to the prompt, efficient, and accurate dispatch of official business in the War Department and its bureaus, to be allotted by the Secretary of War to such bureaus and offices as the exigencies of the existing situation may demand, $900,000: *Provided*, That the Secretary of War shall submit to Congress on the first day of its next regular session a statement showing by bureaus or offices the number and designation of the persons employed hereunder and the annual rate of compensation paid to each.

Additional temporary clerks, etc.

Proviso.

Statement to be submitted in detail.

CONTINGENT EXPENSES.

For purchase of professional and scientific books, law books, including their exchange; books of reference, blank books, pamphlets, periodicals, newspapers, maps; typewriters and adding machines; furniture and repairs to same; carpets, matting, oilcloth, file cases, towels, ice, brooms, soap, sponges, fuel, gas, and heating apparatus for and repairs to buildings (outside of the State, War, and Navy Department Building) occupied by The Adjutant General's Office and other offices of the War Department and its bureaus located in the Lemon Building; freight and express charges; street car tickets not exceeding $300; and other absolutely necessary expenses, including a per diem allowance not to exceed $4 in lieu of subsistence, $415,000.

Contingent expenses.

For stationery for the department and its bureaus and offices, $230,000.

Stationery.

For rent of buildings in the District of Columbia, $75,000.

Rent.

For printing and binding for the War Department, to be executed under the Public Printer, $630,000.

Printing and binding.

* * * * *

MILITARY ESTABLISHMENT.

Army.

CONTINGENCIES OF THE ARMY.

For all contingent expenses of the Army not otherwise provided for and embracing all branches of the military service, including the office of the Chief of Staff; for all emergencies and extraordinary expenses, including the employment of translators and exclusive of all other per-

Contingencies.

Emergencies.

sonal services in the War Department, or any of its subordinate bureaus or offices at Washington, District of Columbia, or in the Army at large, but impossible to be anticipated or classified; to be expended on the approval and authority of the Secretary of War, and for such purposes as he may deem proper, including the payment of a per diem allowance not to exceed $4, in lieu of subsistence, to employees of the War Department traveling on official business outside of the District of Columbia and away from their designated posts, $50,000.

Per diem subsistence.

Registration for draft.
Expenses.
Ante, p. 79.
Post, p. 855.

Registration and selection for military service: For all expenses necessary in the registration of persons available for military service and in the selection of certain such persons and their draft into military service, $2.658,413.

Office, Chief of Staff.

OFFICE OF THE CHIEF OF STAFF.

Contingencies, military information section.

CONTINGENCIES, MILITARY INFORMATION SECTION, GENERAL STAFF CORPS: For contingent expenses of the military information section, General Staff Corps, including the purchase of law books, professional books of reference; periodicals and newspapers, drafting and messenger service; and of the military attachés at the United States embassies and legations abroad; and of the branch office of the military information section at Manila; the cost of special instruction at home and abroad and in maintenance of students and attachés; and for such other purposes as the Secretary of War may deem proper; to be expended under the direction of the Secretary of War: *Provided*, That section thirty-six hundred and forty-eight, Revised Statutes, shall not apply to subscriptions for foreign and professional newspapers and periodicals to be paid for from this appropriation, $500,000.

Proviso.
Periodicals.
R. S., sec. 3648, p. 718.

Observing war operations abroad.

EXPENSES OF MILITARY OBSERVERS ABROAD: For the actual and necessary expenses of officers of the Army on duty abroad for the purpose of observing operations of armies of foreign States at war, to be paid upon certificates of the Secretary of War that the expenditures were necessary for obtaining military information, $85,000.

Service schools.
Fort Leavenworth, Kans.

UNITED STATES SERVICE SCHOOLS: To provide means for the theoretical and practical instruction at the Army service schools (including the Army Staff College, the Army School of the Line, the Army Field Engineer School, the Army Field Service and Correspondence School for Medical Officers, and the Army Signal School) at Fort Leavenworth, Kansas, the Mounted Service School, at Fort Riley, Kansas, and the School of Fire for Field Artillery and for the School of Musketry, at Fort Sill, Oklahoma, by the purchase of textbooks, books of reference, scientific and professional papers, the purchase of modern instruments and material for theoretical and practical instruction, employment of temporary, technical, or special services, and for all other absolutely nec-

Fort Riley, Kans.

Fort Sill, Okla.

essary expenses, to be allotted in such proportion as may, in the opinion of the Secretary of War, be for the best interests of the military service, $25,325.

* * * * *

PAY OF THE ARMY.

Pay of the Army.

* * * * *

CORPS OF ENGINEERS.

Corps of Engineers.

Pay of officers of the Corps of Engineers, $3,024,108.

Addditional pay for length of service, $28,544.59.

* * * * *

Transportation.

TRANSPORTATION OF THE ARMY AND ITS SUPPLIES: For transportation of the Army and its supplies, including transportation of the troops when moving either by land or water, including members of the Officers' Reserve Corps, enlisted men of the Enlisted Reserve Corps, and retired enlisted men when ordered to active duty, and of their baggage, including the cost of packing and crating; for transportation of recruits and recruiting parties; of applicants for enlistment between recruiting stations and recruiting depots; for travel allowance to officers and enlisted men on discharge: for payment of travel allowance as provided in section one hundred and twenty-six of the Act approved June third, nineteen hundred and sixteen, to enlisted men of the National Guard on their discharge from the service of the United States, and to members of the National Guard who have been mustered into the service of the United States and discharged on account of physical disability; for payment of travel pay to officers of the National Guard on their discharge from the service of the United States, as prescribed in the Act approved March second, nineteen hundred and one; for travel allowance to persons on their discharge from the United States disciplinary barracks or from any place in which they have been held under a sentence of dishonorable discharge and confinement for more than six months, or from the Government Hospital for the Insane after transfer thereto from such barracks or place, to their homes (or elsewhere as they may elect), provided the cost in each case shall not be greater than to the place of last enlistment; of the necessary agents and other employees, including per diem allowances in lieu of subsistence not exceeding $4 for those authorized to receive the per diem allowance; of clothing and equipage and other quartermaster stores from Army depots or places of purchase or delivery to the several posts and Army depots and from those depots to the troops in the field; of horse equipment; of ordnance and ordnance stores, and small arms from the foundries and armories to the arsenals, fortifications,

Travel allowances, etc., on discharge. Vol. 39, p. 217.

National Guard officers on discharge. Vol. 31, p. 903.

Per diem subsistence.

Payment to land-grant roads.

Provisos.
Basis of computation.

Fifty per cent to roads not bond aided.

Full pay to excepted roads.

Draft and pack animals, etc.

Vehicles.

frontier posts, and Army depots; for payment of wharfage, tools, and ferriages; for transportation of funds of the Army; for the hire of employees; for the payment of Army transportation lawfully due such land-grant railroads as have not received aid in Government bonds (to be adjusted in accordance with the decisions of the Supreme Court in cases decided under such land-grant Acts), but in no case shall more than fifty per centum of full amount of service be paid: *Provided*, That such compensation shall be computed upon the basis of the tariff or lower special rates for like transportation performed for the public at large and shall be accepted as in full for all demands for such service: *Provided further*, That in expending the money appropriated by this Act a railroad company which has not received aid in bonds of the United States, and which obtained a grant of public land to aid in the construction of its railroad on condition that such railroad should be a post route and military road, subject to the use of the United States for postal, military, naval, and other Government services, and also subject to such regulations as Congress may impose restricting the charge for such Government transportation, having claims against the United States for transportation of troops and munitions of war and military supplies and property over such aided railroads, shall be paid out of the moneys appropriated by the foregoing provision only on the basis of such rate for the transportation of such troops and munitions of war and military supplies and property as the Secretary of War shall deem just and reasonable under the foregoing provision, such rate not to exceed fifty per centum of the compensation for such Government transportation as shall at that time be charged to and paid by private parties to any such company for like and similar transportation; and the amount so fixed to be paid shall be accepted as in full for all demands for such service: *And provided further*, That nothing in the preceding provisos shall be construed to prevent the accounting officers of the Government from making full payment to land-grant railroads for transportation of property or persons where the courts of the United States have held that such property or persons do not come within the scope of the deductions provided for in the land-grant Acts; for the purchase and hire of draft and pack animals in such numbers as are actually required for the service, including reasonable provision for replacing unserviceable animals; for the purchase, hire, operation, maintenance, and repair of such harness, wagons, carts, drays, other vehicles, and motor-propelled and horse-drawn passenger-carrying vehicles, as are required for the transportation of troops and supplies, and for official, military, and garrison purposes; for drayage and cartage at the several depots; for the hire of teamsters and other employees; for the purchase and repair of ships, boats, and other vessels required for the transportation of troops and supplies and for official, military, and garrison purposes; for expenses of sailing public transports and other vessels on the various rivers, the Gulf of Mexico, and the Atlantic and Pacific Oceans, $221,963,745.42.

Ships, boats, etc.

Transports.

* * * * *

HORSES FOR CAVALRY, ARTILLERY, AND ENGINEERS: For the purchase of horses of ages, sex, and size as may be prescribed by the Secretary of War for remounts, for officers entitled to public mounts for the Cavalry, Artillery, Signal Corps, and Engineers, the United States Military Academy, service schools, and staff colleges, and for the Indian scouts, and for such Infantry and members of the Medical Department in field campaigns as may be required to be mounted, and the expenses incident thereto, and for the hire of employees: *Provided*, That the number of horses purchased under this appropriation, added to the number now on hand, shall be limited to the actual needs of the mounted service, including reasonable provisions for remounts, and, unless otherwise ordered by the Secretary of War, no part of this appropriation shall be paid out for horses not purchased by contract after competition duly invited by the Quartermaster Corps and an inspection under the direction and authority of the Secretary of War. When practicable, horses shall be purchased in open market at all military posts or stations, when needed, at a maximum price to be fixed by the Secretary of War: *Provided further*, That no part of this appropriation shall be expended for the purchase of any horse below the standard set by Army Regulations for Cavalry and Artillery horses, except when purchased as remounts or for instruction of cadets at the United States Military Academy: *And provided further*, That no part of this appropriation shall be expended for polo ponies except for West Point Military Academy, and such ponies shall not be used at any other place. $25,000,000.

Horses. Purchase of, etc.

Provisos. Limitations.

Open market purchases.

Standard required.

Polo ponies.

* * * * *

ENGINEER DEPARTMENT.

Engineer Department.

ENGINEER EQUIPMENT OF TROOPS: For pontoon material, tools, instruments, supplies, and appliances required for use in the engineer equipment of troops, for military surveys, and for engineer operations in the field, including the purchase, maintenance, operation, and repair of the necessary motorcycles; the purchase and preparation of engineer manuals and procurement of special paper for same, and for a reserve supply of above equipment, $35,876,000.

Equipment of troops.

Field operations expenses.

ENGINEER OPERATIONS IN THE FIELD: For expenses incident to military engineer operations in the field, including the purchase of material and a reserve of material for such operations, the construction or rental of storehouses within and outside the District of Columbia, the purchase, operation, maintenance, and repair of horse-drawn and motor-propelled passenger-carrying vehicles, and such expenses as are ordinarily provided for under appropriations for "Engineer depots," "Civilian assistants to engineer officers," and "Maps, War Department," $94,500,000.

* * * * *

Fortifications.

FORTIFICATIONS AND OTHER WORKS OF DEFENSE.

Engineer Department.

ENGINEER DEPARTMENT.

Gun and mortar batteries.

For construction of gun and mortar batteries $2,500,000.

Fire-control stations.

Range finders.

For construction and protection of fire-control stations and accessories, including purchase of lands and rights of way, purchase and installation of necessary lines and means of electrical communication, including telephones, dial and other telegraphs, wiring and all special instruments, apparatus, and materials, coast signal apparatus, and salaries of electrical experts, engineers, and other necessary employees connected with the use of coast artillery; purchase, manufacture, and test of range finders and other instruments for fire control at the fortifications, and the machinery necessary for their manufacture at the arsenals, $3,147,225.

Electric plants.

For installation and replacement of electric light and power plants at seacoast fortifications, $1,700,000.

Searchlights.

For purchase and installation of searchlights for seacoast defenses, including searchlights for antiaircraft defense and accessories therefor, $5,900,000.

Torpedo structures, etc.

For construction of mining casemates, cable galleries, torpedo storehouses, cable tanks, and other structures necessary for the operation, preservation, and care of submarine mines and their accessories, and for providing channels for access to torpedo wharves, $500,000.

Land defenses, construction, etc.

For the construction of land defenses in the United States, including the procurement of equipment and materials required therefor, the construction and repair of roads required for military purposes, and the procurement and installation of searchlights, $2,000,000.

Contingent expenses.

For contingent expenses incident to the construction of seacoast fortifications and their accessories, $1,000,000.

* * * * *

Approved June 15, 1917.

CHAP. 31.—Joint Resolution Relating to the service of certain retired officers of the Army.

June 15, 1917.
[S. J. Res. 70.]

[Pub. Res., No. 6.]

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered forty-five of the Sixty- whose active service was in the Corps of Engineers, are called back into active service they shall be eligible to fill any position required by law to be filled by an officer of the Corps of Engineers.

Army.
Eligibility of retired officers for active Engineer service.

Approved, June 15, 1917.

CHAP. 34.—Joint Resolution Extending the time within which the "Joint resolution authorizing the Secretary of War to issue temporary permits for additional diversions of water from the Niagara River" shall remain in effect.

June 30, 1917.
[S. J. Res. 13.]

[Pub. Res., No. 8.]

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered forty-five of the Sixty-fourth Congress, approved January nineteenth, nineteen hundred and seventeen, entitled "Joint resolution authorizing the Secretary of War to issue temporary permits for additional diversions of water from the Niagara River," is continued in full force and effect, and under the same conditions, restrictions, and limitations, until July first, nineteen hundred and eighteen: *Provided,* That the Secretary of War is hereby authorized and directed to make a comprehensive and thorough investigation, including all necessary surveys and maps, of the entire subject of water diversion from the Great Lakes and the Niagara River, including navigation, sanitary and power purposes, and the preservation of the scenic beauty of Niagara Falls and the rapids of Niagara River, and to report to Congress thereon at the earliest practicable date. To carry out the provisions of this proviso, there is hereby appropriated, out of any money in the Treasury not otherwise appropriated, the sum of $25,000.

Niagara River.
Additional diversion of water from, above the Falls, continued for one year.
Vol. 39, p. 867.

Proviso.
Investigation of water diversion, etc.

Appropriation.

Approved, June 30, 1917.

CHAP. 35.—An Act To authorize condemnation proceedings of lands for military purposes.

July 2, 1917.
[S. 2453.]

[Public, No. 26.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That hereafter the Secretary of War may cause proceedings to be instituted in the name of the United States, in any court having jurisdiction of such proceedings for the acquirement by condemnation of any land, temporary use thereof or other interest therein,

Lands for military purposes.
Condemnation proceedings authorized to acquire.

Provisos.
Purchases without suit.
Acceptance of donations allowed.
Immediate use in time of war before title vested.
R. S., sec. 355, p. 60.

or right pertaining thereto, needed for the site, location construction, or prosecution of works for fortifications. coast defenses, and military training camps, such proceedings to be prosecuted in accordance with the laws relating to suits for the condemnation of property of the States wherein the proceedings may be instituted: *Provided*, That when the owner of such land, interest or rights pertaining thereto shall fix a price for the same. which, in the opinion of the Secretary of War, shall be reasonable, he may purchase or enter into a contract for the use of the same at such price without further delay: *Provided further*, That the Secretary of War is hereby authorized to accept on behalf of the United States donations of land and the interest and rights pertaining thereto required for the above-mentioned purposes: *And provided further*, That when such property is acquired in time of war or the imminence thereof upon the filing of the petition for the condemnation of any land, temporary use thereof or other interest therein or right pertaining thereto to be acquired for any of the purposes aforesaid, immediate possession thereof may be taken to the extent of the interest to be acquired and the lands may be occupied and used for military purposes, and the provision of section three hundred and fifty-five of the Revised Statutes, providing that no public money shall be expended upon such land until the written opinion of the Attorney General shall be had in favor of the validity of the title, nor until the consent of the legislature of the State in which the land is located has been given, shall be, and the same are hereby, suspended during the period of the existing emergency.

Approved, July 2, 1917.

July 27, 1917.
[S. 2666.]
[Public, No. 30.]

CHAP. 41.—An Act Granting the consent of Congress to the Sebastian bridge district to construct a bridge across the Arkansas River, at the foot of Garrison Avenue, at Fort Smith, Arkansas.

Arkansas River.
Sebastian bridge district may bridge, Fort Smith, Ark.
Construction.
Vol. 34, p. 84.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Sebastian bridge district, created by the Legislature of Arkansas, its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Arkansas River at a point suitable to the interests of navigation, at the foot of Garrison Avenue, at Fort Smith, in the county of Sebastian, in the State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, July 27, 1917.

July 28, 1917.
[S. 2106.]
[Public, No. 33.]

CHAP. 45.—An Act To authorize the county of Cass, in the State of Indiana, to construct a bridge across the Wabash River east of the city of Logansport, at a point known as Cedar or Rock Island, in said Wabash River.

Wabash River. Cass County, Ind., may bridge, near Logansport.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Cass, State of Indiana, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Wabash River, at a point suitable to the interests of navigation, at a place east of the city of Logansport, at a point known as Cedar or Rock Island, in said Wabash River, in the State of Indiana, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction. Vol. 34, p. 84

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, July 28, 1917.

July 28, 1917.
[S. 2667.]
[Public, No. 34.]

CHAP. 46.—An Act Granting the consent of Congress to the Pritchard-Wheeler Lumber Company, of Wisner, Louisiana, to construct a bridge across Bayou Macon, in Louisiana, at a point east of the town of Wisner, Louisiana.

Bayou Macon. Pritchard-Wheeler Lumber Company may bridge, Wisner, La.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Pritchard-Wheeler Lumber Company, of Wisner, Louisiana, and to its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Bayou Macon at a point suitable to the interests of navigation, at or near a point east of the town of Wisner, Louisiana, in the parish of Franklin, in the State of Louisiana, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction. Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, July 28, 1917.

August 3, 1917.
[S. 2695.]
[Public, No. 35.]

CHAP. 47.—An Act To authorize the construction, maintenance, and operation of a bridge across Little River, at or near the foot of the gar hole about one-half mile south of the Jonesboro, Lake City and Eastern Railway bridge across Little River, Arkansas.

Little River. Mississippi County, Ark., may bridge.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Mississippi, a corporation organized and existing under the laws of the State of

Location.

Construction. Vol. 34, p. 84.

Arkansas, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches across Little River, at or near the foot of the gar hole about one-half mile south of the Jonesboro, Lake City and Eastern Railway bridge across Little River, Arkansas, at a point suitable to the interests of navigation, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, August 3, 1917.

August 8, 1917.
[H. R. 4285.]
[Public, No. 37.]

CHAP. 49.—An Act Making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes.

River and harbor appropriations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums of money be, and are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to be immediately available, and to be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers, for the construction, completion, repair, and preservation of the public works hereinafter named:

Portland, Me.

Portland Harbor, Maine: For completing improvement in accordance with the report submitted in House Document Numbered seventy-one, Sixty-fifth Congress, first session, and subject to the conditions set forth in said document, $300,000.

Boston, Mass. Use of balances.

Boston Harbor, Massachusetts: The unexpended balances of appropriations heretofore made and authorized for this improvement are hereby made available for improvement in accordance with the report submitted in House Document Numbered Nine hundred and thirty-one, Sixty-third Congress, second session.

Gloucester, etc., Mass.

Gloucester, Beverly, Salem, Lynn, Plymouth, and Provincetown Harbors, Mystic, Malden, Weymouth Fore, and Weymouth Back Rivers, and Dorchester Bay and Neponset River, Massachusetts: For maintenance, $24,000.

Providence, etc., R. I. Use of balances.

Providence River and Harbor, Pawtucket River, Newport Harbor, harbors of refuge at Point Judith and Block Island, entrance to Point Judith Pond, and Great Salt Pond, Block Island, Rhode Island: The unexpended balances of appropriations heretofore made for improvement of Providence River and Harbor in accordance with the report submitted in House Document Numbered Nine hundred and nineteen, Sixtieth Congress, first session, are hereby made available for improvement of said river and harbor in accordance with the report submitted in House Document Numbered Thirteen hundred and sixty-nine, Sixty-second Congress, third session.

New London, etc., Conn.

Stonington and New London Harbors, Connecticut, Pawcatuck River, Rhode Island and Connecticut, and Mystic and Thames Rivers, Connecticut: For maintenance, $10,000; for completing improvement of New London Harbor, $160,000; in all, $170,000.

New Haven, etc., Conn.

Duck Island, Branford, New Haven, Milford, Bridgeport, Southport, Norwalk, Five Mile River, Stamford, and Greenwich Harbors, Westport Harbor and Saugatuck River, breakwaters at New Haven, and Housatonic River, Connecticut: For maintenance, $71,000.

Connecticut River, Conn.

Connecticut River above and below Hartford, Connecticut: Continuing improvement and for maintenance below Hartford, $70,100.

Burlington, Plattsburg, etc., Vt. and N. Y.

Lake Champlain Narrows.

Port Henry, N. Y.

Burlington Harbor, Vermont; Plattsburg and Port Henry Harbors, New York; and Narrows of Lake Champlain, New York and Vermont: For maintenance, $5,000; for improvement of Narrows of Lake Champlain in accordance with the report submitted in House Document Numbered Thirteen hundred and eighty-seven, Sixty-second Congress, third session, and subject to the conditions set forth in said document, $300,000; for completing improvement of Port Henry Harbor in accordance with the report submitted in House Document Numbered Three hundred and sixty-nine, Sixty-fourth Congress, first session, and subject to the conditions set forth in said document, $71,500; in all, $376,500.

Lake Ontario harbors, etc., N. Y.

Olcott, Charlotte, Pultneyville, Great Sodus Bay, Little Sodus Bay, Oswego, Cape Vincent, and Ogdensburg Harbors, New York: For maintenance, $33,500.

East Chester Creek, etc., N. Y.

Port Chester, Mamaroneck, and Echo Bay Harbors, East Chester and Westchester Creeks, and Bronx River, New York: Completing improvement of East Chester Creek, $11,000.

Saugerties, etc., N. Y.

Saugerties, Rondout, Peekskill, and Tarrytown Harbors, and Wappinger Creek, New York: For maintenance $3,500.

New York Harbor, N. Y. Channels, and upper bay.

Use of balances.

New York Harbor, New York: For maintenance of entrance channels and for improvement of the upper bay opposite anchorage grounds in accordance with the report submitted in House Document Numbered Five hundred and eighteen, Sixty-third Congress, second session, and at Craven Shoal in accordance with the report submitted in House Document Numbered Five hundred and fifty-seven, Sixty-fourth Congress, first session, $40,000, and the unexpended balances of appropriations heretofore made and authorized for the improvement and maintenance of the entrance channels are hereby made available for continuing improvement in accordance with the reports submitted in said documents; for improve-

Staten Island channel.

ment of channel between Staten Island and Hoffman and Swinburne Islands, in accordance with the report submitted in House Document Numbered Six hundred and twenty-five, Sixty-fourth Congress, first session, $50,000: in all, $90,000.

Hudson River Channel.

Hudson River Channel, New York Harbor, New York: Continuing improvement, $210,500; for improvement in accordance with the report submitted in House Document Numbered Sixteen hundred and ninety-seven, Sixty-fourth Congress, second session, $600,000; in all, $810,500.

Black Rock, etc., N. Y.
Use of balances.

Black Rock Channel and Tonawanda Harbor, New York: The unexpended balances of appropriations heretofore made and authorized for this improvement are hereby made available for Lake Erie entrance to Black Rock Channel and Erie Basin and for widening the channel at the bend.

East River, N. Y.

Hell Gate channel, etc.

East River, New York: For improvement in accordance with the report submitted in House Document Numbered One hundred and eighty-eight, Sixty-third Congress, first session, and for a forty-foot channel through East River and Hell Gate, in accordance with the report submitted in House Document Numbered One Hundred and forty, Sixty-fifth Congress, first session, $1,250,000:

Provisos.
Use of balances.

Depth at Diamond Reef.

Removal of drift, etc.

Provided, That the unexpended balances of appropriations heretofore made and authorized for the improvement of East River and Hell Gate are hereby made available for improvement in accordance with the reports submitted in said document: *Provided further*, That a depth of forty feet is authorized across Diamond Reef: *And provided further*, That so much as may be necessary of this and any other appropriations made herein or hereafter for specific portions of New York Harbor and its immediate tributaries may be allotted by the Secretary of War for the maintenance of these waterways by the collection and removal of drift.

New Jersey.
Maintenance of harbors, etc.

Keyport and Shoal Harbors, Woodbridge, Cheesequake, Matawan, and Compton Creeks, Elizabeth, Raritan, South, and Shrewsbury Rivers, and Raritan Bay, New Jersey: For maintenance, $58,000.

Cold Spring Inlet, etc., N. J.

Cold Spring and Absecon Inlets, Absecon and Tuckerton Creeks, and Toms River, New Jersey: For maintenance, $35,000.

Maurice, etc., Rivers, N. J.

Cooper, Salem, Cohansey, and Maurice Rivers, Woodbury, Mantua, Raccoon, Oldmans, and Alloway Creeks, New Jersey: For maintenance, $23,000; continuing improvement and for maintenance of Maurice River, $25,000; in all, $48,000.

Pittsburgh, Pa.

Pittsburgh Harbor, Pennsylvania: For maintenance, $5,000.

Schuylkill River, Pa.

Schuylkill River, Pennsylvania: For improvement in accordance with the report submitted in House Document Numbered Twelve hundred and seventy, Sixty-fourth Congress, first session, and subject to the conditions set forth in said document, $300,000.

Delaware River, Pa., N. J., and Del. Philadelphia to the sea. To Trenton.

Delaware River, Pennsylvania, New Jersey, and Delaware: Continuing improvement and for maintenance from Allegheny Avenue, Philadelphia, to the sea, $1,870,000; for maintenance of improvement from Allegheny Avenue, Philadelphia, to Lalor Street, Trenton, $40,000; in all, $1,910,000.

Wilmington, Del.

Wilmington Harbor, Delaware: For maintenance, $50,000.

Appoquinimink, etc., Rivers, Del.

Appoquinimink, Smyrna, Leipsic, Little, Saint Jones, Murderkill, Mispillion, and Broadkill Rivers, Delaware: For maintenance, $30,000.

Lewes, Del. Iron pier.

Government iron pier in Delaware Bay near Lewes, Delaware: For maintenance and repair in accordance with the report submitted in House Document Numbered Ten hundred and fifty-nine, Sixty-fourth Congress, first session, $68,000.

Waterway, Rehoboth and Delaware Bays.

Waterway between Rehoboth Bay and Delaware Bay, Delaware: Continuing improvement and for maintenance, $50,000.

Chincoteague Bay, Va., to Lewes, Del.

Waterway from Chincoteague Bay, Virginia, to Delaware Bay at or near Lewes, Delaware: For maintenance, $1,000.

Waterway, Delaware River to Chesapeake Bay, Del. and Md.

Improving inland waterway from Delaware River to Chesapeake Bay, Delaware and Maryland, in accordance with the project recommended by the Chief of Engineers in House Document Numbered Three hundred and ninety-one, Sixty-second Congress, second session, and in paragraph three of his report, dated August ninth, nineteen hundred and thirteen, as published in House Document Numbered One hundred and ninety-six, Sixty-third Congress, first session:

Purchase of Chesapeake and Delaware Canal authorized.

The Secretary of War is hereby authorized to enter into negotiations for the purchase of the existing Chesapeake and Delaware Canal, and all the property, rights of property, franchises, and appurtenances used or acquired for use in connection therewith or appertaining thereto; and he is further authorized, if in his judgment the price is reasonable and satisfactory, to make a contract for the purchase of the same, subject to future ratification and appropriation by Congress.

Condemnation proceeding if no contract agreed to.

In the event of the inability of the Secretary of War to make a satisfactory contract for the voluntary purchase of said canal and its appurtenances, he is hereby authorized and directed through the Attorney General to institute and to carry to completion proceedings for the condemnation of the said canal and its appurtenances, the acceptance of the award in said proceedings to be subject to future ratification and appropriation by Congress.

Procedure.

Such condemnation proceedings shall be instituted and conducted in, and jurisdiction of said proceedings is hereby given to, the District Court of the United States for the District of

Vol. 25, p. 357.

Delaware substantially as provided in "An Act to authorize condemnation of land for sites for public buildings, and for other purposes," approved August first, eighteen hundred and eighty-eight, and the sum of $5,000 is hereby appropriated to pay the necessary costs thereof and expenses in connection therewith.

Baltimore, Md.
Patapsco River, etc.

Baltimore Harbor and Channels, Maryland: For maintenance of Patapsco River and Channel to Baltimore, including channel of approach at York Spit, Chesapeake Bay, $104,000; for improvement in accordance with the report submitted in House Document Numbered Seven hundred and ninety-nine, Sixty-fourth Congress, first session, and subject to the conditions set forth in said document, $250,000; and the Secretary of War is hereby authorized to prosecute maintenance work in the inner harbor in accordance with the recommendation submitted in said document; in all, $354,000.

Maryland eastern shore harbors, etc.

Rockhall, Queenstown, Claiborne, Tilghman Island, Cambridge, and Crisfield Harbors, Elk and Little Elk, Chester, Corisca, Choptank, Tuckahoe, Warwick, La Trappe, Tred Avon, Wicomico, Manokin, and Pocomoke Rivers, Slaughter, Tyaskin, and Broad Creeks, Twitch Cove and Big Thoroughfare River, and Lower Thoroughfare, Deal Island, Maryland; Nanticoke River (including Northwest Fork), Delaware and Maryland; and Broad Creek River, Delaware: For maintenance, $15,800.

Potomac River, etc., D. C., Md., and Va.

Potomac River, at Washington, District of Columbia, at Alexandria, Virginia, and at Lower Cedar Point, Maryland, Anacostia River, District of Columbia, Occoquan, Aquia, Upper Machodoc, and Nomini Creeks, Virginia: For maintenance, $30,000.

Norfolk, Va.
Channel to Newport News, etc.

Norfolk Harbor and Channels, Virginia: For improvement, including channel to Newport News, in accordance with the report submitted in House Document Numbered Six hundred and five, Sixty-third Congress, second session, and in accordance with the report submitted in House Document Numbered One hundred and forty, Sixty-fifth Congress, first session, item "B," page five, $900,000.

Use of balances.

The unexpended balance of appropriations heretofore made for improvement of channel to Norfolk, Virginia, is hereby made available for continuing improvement of said channel in accordance with the report submitted in said document.

Rappahannock, etc., Rivers, Va.

Rappahannock, Mattaponi, and Pamunkey Rivers, Urbana Creek, and Milford Haven Harbor, Virginia: For maintenance, $15,000.

James River, etc., Va.

James, Nansemond, Pagan, and Appomattox Rivers, Virginia: For maintenance, $26,000; continuing improvement of James River, $46,000; in all, $72,000.

Blackwater River, Va., etc.

Blackwater River, Virginia: Meherrin and Roanoke Rivers, North Carolina: For maintenance, $2,500.

Waterway from Norfolk, Virginia, to Beaufort Inlet, North Carolina: Continuing improvement, $100,000: *Provided*, That the route of the waterway may, in the discretion of the Secretary of War, be modified in accordance with the report submitted in House Document Numbered Fourteen hundred and seventy-eight, Sixty-third Congress, third session: *And provided further*, That not more than $75,000 shall be expended in acquiring the necessary rights of way between Albemarle Sound and Pungo River.

Waterway, Norfolk, Va., to Beaufort Inlet, N. C.
Provisos.
Discretionary route.
Rights of way.

Manteo Bay, Scuppernong, Pamlico, Tar, South, Bay, Neuse, and Trent Rivers, Fishing, Contentnea, Swift, and Smith Creeks, and waterway connecting Swan Quarter Bay with Deep Bay, North Carolina: For maintenance, $15,500.

Manteo Bay, Tar River, etc., N. C.

Beaufort and Morehead City Harbors, Beaufort Inlet, waterway from Pamlico Sound to Beaufort Inlet, waterway connecting Core Sound and Beaufort Harbor, and inland waterway Beaufort to Jacksonville, North Carolina: For maintenance, $35,500; and the unexpended balances of appropriations heretofore made for New River, North Carolina, are hereby made available for the improvement of the inland waterway, Beaufort to Jacksonville, North Carolina, in accordance with the report submitted in House Document Numbered Seventeen hundred and seventy-five, Sixty-fourth Congress, second session.

Waterways, North Carolina.

Northeast, Black, and Cape Fear Rivers, North Carolina: For maintenance, $85,000; completing improvement of Cape Fear River below Wilmington, $35,000; in all, $120,000.

Cape Fear River, etc., N. C.

Charleston Harbor and Channels, South Carolina: For maintenance, $40,000; for improvement in accordance with the report submitted in House Document Numbered Two hundred and eighty-eight, Sixty-second Congress, second session, and subject to the conditions set forth in said document, $70,000; for maintenance of Ashley River Channel, $10,000; in all, $120,000.

Charleston, S. C.

Winyah Bay, Waccamaw, Little Peedee, and Great Peedee Rivers, South Carolina: For maintenance, $70,000.

Winyah Bay, etc., S. C.

Santee, Wateree, and Congaree Rivers, South Carolina: For maintenance, including the Estherville-Minim Creek Canal and the Congaree River as far up as the Gervais Street Bridge, Columbia, and for improvement of the Congaree River in accordance with the report submitted in House Document Numbered Seven hundred and two, Sixty-third Congress, second session, $80,000.

Congaree, etc., Rivers, S. C.

Waterway between Beaufort, South Carolina, and Saint Johns River, Florida: Continuing improvement and for maintenance, $43,000.

Waterway, Beaufort, S. C., to Saint Johns River, Fla.

Savannah Harbor, and Savannah River, below, at, and above Augusta, Georgia: For maintenance, $380,000; for

Savannah Harbor and River, Ga.

improvement of Savannah Harbor in accordance with the report submitted in House Document Numbered Fourteen hundred and seventy-one, Sixty-fourth Congress, second session, and subject to the conditions set forth in said document, $500,000: *Provided*, That no expense shall be incurred by the United States for acquiring any lands required for the purpose of this improvement; in all, $880,000.

Proviso.
No payment for lands.

Harbors, etc., Ga. and Fla.

Sapelo, and Darien Harbors, Cowhead, and Satilla Rivers, Club, Plantation, and Fancy Bluff Creeks, Georgia, and Saint Marys River, Georgia and Florida: For maintenance, $12,500.

Brunswick, Ga.

Brunswick Harbor, Georgia: For maintenance, $33,250.

Oconee, etc., Rivers, Ga.

Altamaha, Oconee, and Ocmulgee Rivers, Georgia: Continuing improvement and for maintenance, $40,000.

Miami Harbor, etc., Fla.

Indian River, Saint Lucie Inlet, Miami Harbor (Biscayne Bay), and Harbor at Key West, Florida: For maintenance, $6,000; completing improvement of Miami Harbor, $160,000: *Provided*, That the work proposed under the project adopted by the river and harbor Act approved July twenty-fifth, nineteen hundred and twelve, may be done by contract if reasonable prices can be obtained; in all, $166,000.

Proviso.
Contract work.
Vol. 37, p. 209.

Tampa Bay, etc., Fla.
Hillsboro Bay, Fla.

Tampa and Hillsboro Bays, Saint Petersburg Harbor. Hillsboro, and Manatee Rivers, Florida: For maintenance, $66,500; for improvement of Hillsboro Bay in accordance with the report submitted in House Document Numbered Thirteen hundred and forty-five, Sixty-fourth Congress, first session, and subject to the conditions set forth in said document, $300,000; in all, $366,500: *Provided*, That nothing in this Act, nor in the Act approved June twenty-fifth, nineteen hundred and ten, entitled "An Act making appropriations for the construction, repair and preservation of certain public works on rivers and harbors, and for other purposes," shall be so construed as to prevent the use of any part of the Ybor Estuary zone for industrial or other legitimate purposes when the same is not needed for commercial uses, nor to exclude the building and operation of a railroad or railroads by private parties or railroad companies under such rules and regulations as the Secretary of War may prescribe, subject to the right of the city of Tampa to construct and operate a municipal railroad on said estuary zone as set forth in said report. The Secretary of War is hereby authorized to prosecute the work of improvement on the existing project for Saint Petersburg Harbor, in accordance with the modified conditions recommended by the Chief of Engineers and the Board of Engineers for Rivers and Harbors in the report printed in Rivers and Harbors Committee Document Numbered Six, Sixty-fourth Congress, second session.

Proviso.
Use of Ybor Estuary.
Vol. 36, p. 644.

Saint Petersburg, Fla.

Saint Johns River, Florida, Jacksonville to the ocean, opposite the city of Jacksonville, Jacksonville to Palatka, and Palatka to Lake Harney, Lake Crescent and Dunns Creek, and Oklawaha River, Florida: For maintenance, $335,000.

Saint Johns River, etc., Fla.

Kissimmee, Caloosahatchee, Orange, Anclote, Crystal, Withlacoochee, and Suwannee Rivers, Charlotte Harbor, Sarasota Bay, and Clearwater Harbor and Boca Ceiga Bay, Florida: For maintenance, $11,000.

Kissimmee River, etc., Fla.

Removing the water hyacinth, Florida: For the removal of the water hyacinth from the navigable waters in the State of Florida, in so far as it is or may become an obstruction to navigation, $10,000.

Water hyacinth. Removing from Florida waters.

Carabelle Bar and Harbor, Apalachicola, Saint Joseph, and Saint Andrews Bays, Apalachicola and Chipola Rivers, and channel from Apalachicola River to Saint Andrews Bay, Florida, Flint River, Georgia, and Chattahoochee River, Georgia and Alabama: For maintenance, $77,500; continuing improvement of Apalachicola River, including the cut-off, Lee Slough, lower Chipola River, and upper Chipola River from Marianna to its mouth, $18,000; in all, $95,500.

Apalachicola River, etc., Fla. and Ga.

Holmes and Blackwater Rivers, Florida, Choctawhatchee, Escambia, and Conecuh Rivers, Florida and Alabama, the narrows in Santa Rosa Sound, and Pensacola Harbor, Florida: For maintenance, $9,500.

Pensacola, Fla., etc.

Mobile Harbor and Bar, and channel connecting Mobile Bay and Mississippi Sound, Alabama: For maintenance of channel connecting Mobile Bay and Mississippi Sound, $5,000: for maintenance of Mobile Harbor and Bar and for improvement in accordance with the report submitted in House Document Numbered Seventeen hundred and sixty-three, Sixty-fourth Congress, second session, and subject to the conditions set forth in said document, except as to pilotage and terminal facilities, $110,000; in all, $115,000.

Mobile, Ala.

Alabama River, Alabama, and Coosa River, Alabama and Georgia: Continuing improvement and for maintenance, including the Alabama and Coosa Rivers between Montgomery and Wetumpka, $50,000.

Alabama and Coosa Rivers, Ala. and Ga.

Tombigbee River, Alabama and Mississippi: For maintenance from mouth to Demopolis, Alabama, $30,000, and from Demopolis, Alabama, to Walkers Bridge, Mississippi, $10,000: in all, $40,000.

Tombigbee River, Ala. and Miss.

Pascagoula Harbor, Mississippi: Continuing improvement and for maintenance of channels through Horn Island Pass, Mississippi Sound, Pascagoula River, and Dog River, $113,000.

Pascagoula Harbor, Miss.

Gulfport Harbor, Mississippi: Continuing improvement and for maintenance of anchorage basin at Gulfport and channel therefrom to the anchorage or roadstead at Ship Island, and for the improvement and maintenance of channel at Ship Island Pass, $80,000.

Gulfport, Harbor, Miss.

Pascagoula, etc., Rivers, Miss.

Pascagoula, Wolf, Jordan, Pearl, and East Pearl Rivers, and Biloxi Harbor, Mississippi: For maintenance, $10,000.

Yazoo River, etc., Miss.

Yazoo River and tributaries, Mississippi: For maintenance, including Yazoo, Tallahatchie, Coldwater, and Big Sunflower Rivers, Tchula Lake, Steele, and Washington Bayous, Lake Washington, and Bear Creek, $20,000.

Mississippi River passes, La.

Passes at the mouth of the Mississippi River: Continuing improvement and for maintenance, $1,825,000.

Bayous Lafourche, etc., La.

Bayous Lafourche, Terrebonne, Grossetete, Plaquemine, and Teche, Louisiana: For maintenance, including Grand River and Pigeon Bayous, $64,000.

Waterway, from the Mississippi to the Sabine, La.

Mermentau to Sabine, La. and Tex.

Waterway from the Mississippi River to the Sabine River, Louisiana: For maintenance, $7,000; for completing improvement from Mermentau River to Sabine River, Louisiana and Texas, in accordance with the report submitted in Senate Document Numbered Seven hundred and five, Sixty-fourth Congress, second session, and subject to the conditions set forth in said document, $230,000; in all, $237,000.

Lake Pontchartrain, etc., La.

Lake Pontchartrain, Pass Manchac, Bogue Falia, Chefuncte, Ponchatoula, Natalbany, Blood, Tickfaw, and Amite Rivers, and Bayou Manchac, Louisiana: For maintenance, $4,000; for completing improvement of Lake Pontchartrain in accordance with the report submitted in House Document Numbered One hundred and seventy-six, Sixty-third Congress, first session, $32,000: in all, $36,000.

Bayous Vermilion, etc., La.

Bayous Vermilion, Nezpique, des Cannes, Plaquemine Brule, and Queue de Tortue, Mermentau River, and Calcasieu River and Pass, Louisiana: Continuing improvement and for maintenance, including channel, bay, and passes of Bayou Vermilion, and tributaries of Mermentau River, $51,000.

Water hyacinth. Removing, Alabama, Mississippi, Louisiana, and Texas.

Removing the water hyacinths, Alabama, Mississippi, Louisiana, and Texas: For the removal of the water hyacinth from the navigable waters in the States named in so far as it is or may become an obstruction to navigation, $20,000.

Atchafalaya River, La.

Atchafalaya River, Louisiana: For maintenance, $20,000.

Sabine Pass and Port Arthur Canal, etc., La. and Tex.

Harbor at Sabine Pass and Port Arthur Canal, Sabine-Neches Canal, and Johnsons Bayou, Louisiana and Texas: For maintenance, $110,000; continuing improvement of Sabine Pass and Port Arthur Canal, $300,000; in all, $410,000.

Red River, etc., Ark., Tex., and La.

Red and Sulphur Rivers, Arkansas and Texas, and Cypress Bayou and Waterway between Jefferson, Texas, and Shreveport, Louisiana: For maintenance, $5,000.

Galveston Harbor, etc., Tex.

Galveston Harbor, Galveston Channel, Port Bolivar Channel, Texas City Channel, and Houston Ship Channel, Texas: For maintenance, $480,000.

Port Aransas, Texas: Continuing improvement and for maintenance, $100,000. Port Aransas, Tex.

Anahuac Channel, mouth of Trinity River, Oyster, and Clear Creeks, and Cedar, Chocolate, Turtle, Bastrop, Dickinson, Double, and East Bay Bayous, Texas: For maintenance, $33,300. Anahuac Channel, etc., Tex.

Waterway from Galveston to Corpus Christi, and channel from Pass Cavallo to Port Lavaca, Texas: For maintenance, $90,000. Waterway, Galveston to Corpus Christi, Tex., etc.

Freeport Harbor, Texas: For maintenance of mouth of Brazos River, $66,000; for improvement in accordance with the report submitted in House Document Numbered Fourteen hundred and sixty-nine, Sixty-third Congress, third session, and subject to the conditions set forth in said document, $150,000; in all, $216,000. Freeport Harbor, Tex.

Red, Black, Ouachita, Tensas, Boeuf, and Saline Rivers, and Bayous Macon, Bartholomew, D'Arbonne, and Corney, Arkansas and Louisiana: For maintenance, $65,000. The balance of appropriations heretofore made for the construction of Lock and Dam Numbered Seven, Ouachita River, Arkansas and Louisiana, is hereby made available, in the discretion of the Secretary of War, for the construction of Lock and Dam Numbered Five. Ouachita, etc., Rivers, Ark. and La. Dam No. 5.

Arkansas River, Arkansas and Oklahoma: For maintenance by snagging operations, $35,000. Arkansas River, Ark. and Okla.

Black and Current Rivers, Arkansas and Missouri; White, Saint Francis, and L'Anguille Rivers, and Blackfish Bayou, Arkansas: For maintenance, $28,700. Black River, etc., Ark. and Mo.

Cumberland River, Tennessee and Kentucky: For maintenance above Nashville, $5,000; continuing improvement below Nashville, $632,000; in all, $637,000. Cumberland River, Tenn. and Ky.

Tennessee River, Tennessee, Alabama, and Kentucky: For maintenance and continuing improvement, $401,000. Tennessee River, Tenn., Ala., and Ky.

Toledo, Port Clinton, Sandusky, Huron, Vermilion, Lorain, Cleveland, Fairport, Ashtabula, and Conneaut Harbors, Ohio: For maintenance, $132,000; completing improvement of Lorain Harbor in accordance with the report submitted in House Document Numbered Nine hundred and eighty, Sixty-fourth Congress, first session, and subject to the conditions set forth in said document, $16,500; for completing improvement of Lorain Harbor in accordance with House Document Numbered Nine hundred and eighty-five, Sixty-fourth Congress, first session, $63,150; for improvement of Cuyahoga River, Cleveland Harbor, in accordance with the report submitted in House Document Numbered Seven hundred and seven, Sixty-third Congress, second session, and subject to the conditions set forth in said document, $5,000: *Provided*, That the Government's share in the cost of the improvement in accordance with the final plans adopted shall not exceed $400,000; in all, $216,650. The unexpended balances of appropriations heretofore Lake Erie harbors, etc., Ohio. Lorain, Ohio. Cleveland, Ohio. *Proviso.* Limit of cost.

Conneaut, Ohio.
Use of balances.

made and authorized for the improvement of Conneaut Harbor, Ohio, are hereby made available for completing improvement in accordance with the report submitted in House Document Numbered Nine hundred and eighty-three, Sixty-fourth Congress, first session.

Ohio River.
Locks and dams.

Ohio River: Continuing improvement by the construction of locks and dams with a view to securing a navigable depth of nine feet, $5,000,000. Upon the recommendation of the Chief of Engineers and the approval of the Secretary of War the project for the improvement of the Ohio River may be so modified as to permit the construction of one lock and fixed dam to replace Locks and Dams Numbered One and Two, should such modification be deemed desirable and advantageous.

Lake Superior harbors, etc., Mich., Wis., and Minn.

Grand Marais, Marquette, Marquette Bay, and Ontonagon Harbors, and Keweenaw Waterway, Michigan: Ashland and Port Wing Harbors, Wisconsin; Duluth-Superior Harbor, Minnesota and Wisconsin; Agate Bay and Grand Marais Harbors, Minnesota: For maintenance, $175,000; completing improvement of Ashland Harbor in accordance with the modified plans in the report submitted in House Document Numbered Sixteen hundred and ninety-eight, Sixty-fourth Congress, second session, $10,000; in all, $185,000.

Lake Michigan harbors, etc., Mich.

Saint Joseph Harbor and River, Saugatuck Harbor and Kalamazoo River, South Haven, Holland, Grand Haven, Muskegon, White Lake, Ludington, Manistee, Portage Lake, Arcadia, Frankfort, Charlevoix, and Petoskey Harbors, and Grand River, Michigan: For maintenance, $112,050; continuing improvement of Manistee Harbor, $28,700; in all, $140,750.

Lake Huron harbors, etc., Mich.

Mackinac, Cheboygan, Rogers City, Alpena, Harbor Beach, and Monroe Harbors, Saginaw, Black, Clinton, and Rouge Rivers; Michigan: For maintenance, $13,500; for improvement of Harbor Beach Harbor in accordance with the report submitted in House Document Numbered Seventeen hundred, Sixty-fourth Congress, second session, $100,000; for improvement of Rouge River, Michigan, in accordance with the report submitted in House Document Numbered Two thousand and sixty-three, Sixty-fourth Congress, second session, and subject to the conditions set forth in said document, $490,000: *Provided*, That the Secretary of War may, in his discretion, substitute plan B for plan A; in all, $603,500.

Harbor Beach, Mich.

Rogue River, Mich.

Proviso.
Discretionary project.

Great Lakes ship channel.

Ship channel connecting waters of the Great Lakes between Chicago, Duluth, and Buffalo, including Saint Marys River, Saint Clair River, channels in Lake Saint Clair, and Detroit River, Michigan: For maintenance, $185,000.

Lake Michigan harbors, etc., Wis.

Manistique Harbor, Michigan, Menominee, Oconto, Green Bay, Algoma, Kewaunee, Two Rivers, Manitowoc, Sheboygan, Port Washington, Milwaukee, Racine, Kenosha, and Waukegan Harbors, Sturgeon Bay and Lake Michigan Ship Canal, and Fox River, Wisconsin: For maintenance, $52,100: *Provided*, That this amount is hereby made available for maintenance of the channel to the established depth of the Milwaukee, Menominee, and Kinnikinnic Rivers, Inner Harbor, Milwaukee, Wisconsin. The project for the improvement of Green Bay Harbor, Wisconsin, is hereby modified to include the maintenance of the turning basin at Depere in accordance with the report submitted in House Document Numbered One thousand and seventeen, Sixty-fourth Congress, first session.

Proviso.
Channel depths, Milwaukee, etc.

Depere, Wis., turning basin.

Saint Croix, etc., Rivers, Minn., Wis., N. and S. Dak.

Saint Croix River, Wisconsin and Minnesota, Minnesota River, Minnesota, Lake Traverse, Minnesota and South Dakota, Red River of the North, Minnesota and North Dakota, Warroad Harbor and River, Zippel Bay, and Lake of the Woods, Minnesota: For maintenance, $3,000.

Chicago, etc., Ill. and Ind.

Indiana Harbor, Ind.

Chicago and Calumet Harbors, Chicago and Illinois Rivers, Illinois, Calumet River, Illinois and Indiana, Indiana and Michigan City Harbors, Indiana: For maintenance, $115,000; completing improvement of Indiana Harbor, $395,200; in all, $510,200.

Mississippi River.
From the Ohio to the Missouri.

Mississippi River from the mouth of the Ohio River to and including the mouth of the Missouri River: Continuing improvement and for maintenance, $350,000.

Memphis, Tenn.
Removal of bar.

The Mississippi River Commission shall forthwith make an examination of the Memphis Harbor, on the Mississippi River at the mouth of Wolf River, and at the earliest practicable moment make such plans and take such steps, to be approved by the Chief of Engineers, as will remove the large sand bar in front of Memphis to such an extent as may be necessary in the interest of navigation at that point, such improvements to be paid out of any funds heretofore or hereafter appropriated for the work of the Mississippi River Commission, not to exceed, however, the sum of $250,000 for the current fiscal year.

To Minneapolis, Minn.

Mississippi River from the mouth of the Missouri River to Minneapolis, Minnesota: Continuing improvement and for maintenance, $1,200,000.

Above Saint Paul, Minn.

Mississippi River between Saint Paul and Minneapolis, and between Brainerd and Grand Rapids, Mississippi and Leech Rivers, and reservoirs at headwaters of Mississippi River: For maintenance, $2,000; continuing improvement of Mississippi and Leech Rivers, $50,000; in all, $52,000.

Osage and Gasconade Rivers, Mo.

Kansas River, Kans.

Osage and Gasconade Rivers, Missouri, and Kansas River, Kansas: Continuing improvement and for maintenance of Osage and Gasconade Rivers, $20,000; completing improvement of Kansas River in accordance with the report submitted in House Document Numbered Five hundred and eighty-four, Sixty-third Congress, second session, and subject to the conditions set forth in said document, $10,000; in all, $30,000.

Missouri River.
Six-foot channel, etc.

Missouri River: For maintenance and continuing improvement with a view to securing a permanent six-foot channel, between Kansas City, Kansas, from the upper end of Quindaro Bend, and the mouth of the river, $1,000,000; for snagging and maintenance between Kansas City and Sioux City, $35,000; for maintenance between Sioux City and Fort Benton, $50,000; in all. $1,085,000.

Provisos.
Cambridge Bend, Glasgow, Mo.

Provided, That there shall be expended, out of the $1,000,000 above appropriated, as soon as practicable, and, if possible, before June first, nineteen hundred and eighteen, $25,000, or so much thereof as may be necessary, subject to such terms of local cooperation as the Secretary of War may prescribe, not to exceed one-half the cost of the improvement, at Cambridge Bend, near Glasgow, Missouri, from the head of said bend to Bowlers Point, in constructing all necessary new works and in putting in thorough repair existing works, so that the same shall effectively protect the banks and confine the river to its channel at and along said bend: *And provided further*, That the Secretary of War is hereby authorized to transfer to the Missouri River for work thereon, free of cost, two dredges not necessarily employed elsewhere.

Transfer of dredges.

San Diego, Cal.

San Diego Harbor, California: For maintenance, $20,000; completing improvement of San Diego Harbor in accordance with the report submitted in House Document Numbered One hundred and forty, Sixty-fifth Congress, first session, and by dredging area "A" in accordance with the project submitted on page fourteen of House Document Numbered Six hundred and forty-eight, Sixty-fourth Congress, first session, as modified in the report printed in Rivers and Harbors Committee Document Numbered Eight, Sixty-fourth Congress, second session, $154,000; in all, $174,000.

Los Angeles, Cal.

Los Angeles Harbor, California: For maintenance, $25,000; and for improvement in accordance with the report submitted in House Document Numbered Eight hundred and ninety-six, Sixty-third Congress, second session, and subject to the conditions set forth in said document, $50,000: *Provided*, That no expense shall be incurred by the United States for acquiring any lands required for the purpose of this improvement; in all, $75,000. Such modification as may be recommended by the Chief of Engineers and approved by the Secretary of War for the plan of silt-diversion works adopted by the river and harbor Act approved July twenty-seventh, nineteen hundred and sixteen, for the protection of Los Angeles and Long Beach Harbors, in accordance with the report printed in House Document Numbered Four hundred and sixty-two, Sixty-fourth Congress, first session, is hereby authorized, subject to the conditions set forth in said document: *Provided*, That such modifica-

Proviso.
No expense for lands.

Modifications authorized.

tions shall not increase the total cost of the work to the United States.

No increase of cost.

San Francisco Harbor, etc., Cal.

Proviso. Dredging plant.

Richmond, Cal.

Humboldt Bay, etc., Cal.

San Pablo Bay, etc., Cal.

San Francisco, Oakland, Richmond, Monterey, and Humboldt Harbors, Redwood, and Petaluma Creeks, Napa River, San Pablo Bay, Mare Island Strait, and Suisun Channel, California: For maintenance, $287,500; continuing improvement of Oakland Harbor, $92,000: *Provided*, That if in the judgment of the Secretary of War the prices received in response to advertisements for bids for dredging are not reasonable, so much of the amount herein appropriated as shall be necessary may be expended for the purchase or construction of a suitable dredging plant; for improvement of Richmond Harbor in accordance with the report submitted in House Document Numbered Five hundred and fifteen, Sixty-third Congress, second session, and subject to the conditions set forth in said document, $100,000; continuing improvement of Humboldt Harbor and Bay, $190,500; for improvement of San Pablo Bay and Mare Island Strait in accordance with the report submitted in House Document Numbered One hundred and forty, Sixty-fifth Congress, first session, if required for naval needs, $330,000; in all, $1,000,000.

Sacramento River, etc., Cal.

Sacramento, Feather, San Joaquin, and Mokelumne Rivers, and Stockton and Mormon Channels (diverting canal), California: For maintenance, $31,000.

Coquille River, Coos Bay, etc., Oreg.

Coquille, Coos, Siuslaw, and Yaquina Rivers, and Coos, Tillamook, and Nehalem Bays, Oregon: For maintenance, $34,000; continuing improvement of channel over the bar at Coos Bay, $70,000; in all, $104,000.

Columbia River, etc., Oreg., Wash., and Idaho.

Cascades and Dalles-Celilo Canals, Oregon, Columbia River and tributaries above Celilo Falls to the mouth of Snake River, Oregon and Washington, and Snake River, Oregon, Washington, and Idaho: Continuing improvement and for maintenance, $70,000.

Willamette River, etc., Oreg. and Wash.

Willamette River above Portland and at Willamette Falls, Yamhill and Clatskanie Rivers, Oregon, Cowlitz, Lewis, and Grays Rivers, Washington: For maintenance, $48,300; completing improvement of Willamette River around the Willamette Falls at Oregon City, Oregon, in accordance with the report submitted in House Document Numbered One thousand and sixty, Sixty-second Congress, third session, $80,000; continuing improvement of Lewis River, including North and East Forks, $13,500; in all, $141,800.

Columbia and Willamette Rivers, below Portland, Oreg.

Proviso. Cathlamet, Wash.

Columbia and lower Williamette Rivers below Vancouver, Washington, and Portland, Oregon, and mouth of Columbia River, Oregon and Washington: Continuing improvement and for maintenance, in accordance with report submitted in Senate Document Numbered Fifty-seven, Sixty-fifth Congress, first session, $310,000: *Provided*, That of the funds herein appropriated $6,000, or so much thereof as may be necessary, may be expended in completing improvement at Cathlamet, Washington, in accordance with the report submitted in House Document Numbered One hundred and twenty, Sixty-thir Congress, first session.

Willapa River, etc., Wash.

Willapa River and Harbor, Grays Harbor, Chehalis and Hoquiam Rivers, Washington: For maintenance, $7,500; for improvement of Grays Harbor in accordance with the report submitted in House Document Numbered Seventeen hundred and twenty-nine, Sixty-fourth Congress, second session, $85,000: *Provided*, That pending the construction of the new dredge authorized any other Government dredge that may be available may be used for the deepening and maintenance of the bar channel: in all, $92,500.

Proviso. Use of dredge.

Puget Sound, tributaries, etc., Wash.

Puget Sound and its tributary waters, Olympia, Tacoma, and Bellingham Harbors, Lake Washington Ship Canal, Snohomish and Skagit Rivers, Swinomish Slough, waterway connecting Port Townsend Bay and Oak Bay, Columbia River between Wenatchee and Kettle Falls, Washington: For maintenance, $30,000; for improvement of Lake Washington Ship Canal in accordance with the report submitted in House Document Numbered Eight hundred, Sixty-fourth Congress, first session, $200,000; in all, $230,000.

Lake Washington Ship Canal.

Nome Harbor, etc., Alaska.

Nome Harbor and Apoon mouth of Yukon River, Alaska: Completing improvement of Apoon mouth of Yukon River in accordance with the report submitted in House Document Numbered Nine hundred and ninety-one, Sixty-third Congress, first session, $45,000; completing improvement of Nome Harbor in accordance with the report submitted in House Document Numbered Nineteen hundred and thirty-two, Sixty-fourth Congress, second session, and subject to the conditions set forth in said document, $105,000; in all, $150,000.

Honolulu, etc., Harbors, Hawaii.

Honolulu, Kahului, and Hilo Harbors, Hawaii: For maintenance $10,000; for improvement of Honolulu Harbor in accordance with the report submitted in House Document Numbered Three hundred and ninety-two, Sixty-fourth Congress, first session, $50,000; and the unexpended balances of appropriations heretofore made and authorized for the improvement of Honolulu Harbor, Hawaii, are hereby made available for improvement in accordance with the above-mentioned report: *Provided*, That if in the judgment of the Secretary of War the prices received in response to advertisement for bids for dredging are not reasonable, so much of the amount herein appropriated and authorized as shall be necessary may be expended for the purchase or construction of a suitable dredging plant; continuing improvement of Hilo Harbor, $150,000; in all, $210,000.

Proviso. Dredging plant.

Hilo.

San Juan, P. R.

San Juan Harbor, Porto Rico: For maintenance, $10,000; for improvement in cooperation with the local government in accordance with the report submitted in House Document Numbered Eight hundred and si five, Sixty-third Congress, second session, $400,000; in all, $410,000: *Provided*, That until $600,000 of the amount expended on the dredging and reclamation work authorized herein is reimbursed, the Government of Porto Rico shall on the first day of July of each year after the completion of the work pay to the Government of the United States $50,000.

Proviso. Reimbursement by Porto Rico.

Allotment of consolidated works.

SEC. 2. Where separate works or items are consolidated herein and an aggregate amount is appropriated therefor, the amount so appropriated shall, unless otherwise expressed, be expended in securing the maintenance and improvement according to the respective projects adopted by Congress after giving due regard to the respective needs of traffic. The allotments to the respective works so consolidated shall be made by the Chief of Engineers as authorized by the Secretary of War. In case such works or items are consolidated and separate amounts are given to individual projects, the amounts so named shall be expended upon such separate projects unless, in the discretion of the Chief of Engineers and the Secretary of War, another allotment or division should be made of the same. Any balances remaining to the credit of the consolidated items shall be carried to the credit of the respective aggregate amounts appropriated for the consolidated items.

Balances carried to authorized works.

Contract work authorized.

SEC. 3. That in all cases where the authorized project for a work of river or harbor improvement provides for the construction or use of Government dredging plant, the Secretary of War may, in his discretion, have the work done by contract if reasonable prices can be obtained.

Appropriation for examinations, surveys, etc.

SEC. 4. That for examinations, surveys, and contingencies for rivers and harbors for which there may be no special appropriation, the sum of $200,000 is hereby appropriated; *Provided*, That no preliminary examination, survey, project, or estimate for new works other than those designated in this or some prior Act or joint resolution shall be made: *Provided further*, That after the regular or formal reports made as required by law on any examination, survey, project, or work under way or proposed are submitted no supplemental or additional report or estimate shall be made unless ordered by a concurrent resolution of Congress: *And provided further*, That the Government shall not be deemed to have entered upon any project for the improvement of any waterway or harbor mentioned in this Act until funds for the commencement of the proposed work shall have been actually appropriated by law.

Provisos. Specific authority required.

Supplementary reports restricted.

Special authority required to begin work.

The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys to be made at the following-named localities, and a sufficient sum to pay the cost thereof may be alloted from the amount provided in this section:

Allotment of preliminary examinations, surveys, etc.

Harbor at Corea, Maine.

Maine.

Massachusetts.

Cape Cod Canal.

Waterway connecting Buzzards Bay and Cape Cod Bay, Massachusetts: The Secretary of War, the Secretary of the Navy, and the Secretary of Commerce are hereby authorized to examine and appraise the value of the works and franchises of the Cape Cod Canal, Massachusetts, connecting Buzzards and Cape Cod Bays, with reference to the advisability of the purchase of said canal by the United States and the construction over the route of the said canal of a free waterway, with or without a guard lock, and having a depth and capacity sufficient to accommodate the navigation interests that are affected thereby. This investigation shall be conducted under the direction of the Secretary of War and the supervision of the Chief of Engineers in the usual manner provided by law for making preliminary examinations and surveys except that the Secretary of War shall call upon the Secretary of the Navy and the Secretary of Commerce for such data and evidence as these Secretaries may wish to have incorporated in the report of survey, and further, that the final report of the investigation, with its conclusions upon probable cost and commercial advantages, and military and naval uses of the said canal, shall be submitted to the Secretary of War, the Secretary of the Navy, and the Secretary of Commerce for their action before it is transmitted to Congress.

Purchase, etc., authorized.

If the said Secretaries are all in favor of the acquisition of the said canal, the Secretary of War is hereby further authorized to enter into negotiations for its purchase, including all property, franchises, and appurtenances used or acquired for use in connection therewith or appertaining thereto; and he is further authorized, if in the judgment of the Secretary of War, the Secretary of the Navy, and the Secretary of Commerce, that the price for such canal is reasonable and satisfactory, to make contracts for the purchase of the same, at the option of the United States, subject to future ratification and appropriation by the Congress; or, in the event of the inability of the Secretary of War to make a satisfactory contract for the voluntary purchase of said Cape Cod Canal and its appurtenances, he is hereby authorized and directed, through the Attorney General, to institute and carry to completion proceedings for the condemnation of said canal and its appurtenances, the acceptance of the award in said proceedings to be subject to the future ratification and appropriation by Congress. Such condemnation proceedings shall be instituted and conducted in, and jurisdiction of said proceedings is hereby given to, the district court of the United States for the district of Massachusetts, substantially as provided in "An Act to authorize condemnation of land for sites for public buildings, and for other purposes," approved August first, eighteen hundred and eighty-eight:

Condemnation proceedings.

Procedure.

Vol. 25, p. 357.

and the sum of $5,000 is hereby appropriated to pay the necessary costs thereof and expenses in connection therewith. The Secretary of War is further authorized and directed to report the proceedings hereunder to Congress.

Appropriation.

Rhode Island.

Providence Harbor, Rhode Island.

Pawtucket River, Rhode Island, with a view to increasing the width of channel through the ledge near Pawtucket.

New York.

Sterling Basin, at Greenport, New York, with a view to securing adequate width and depth.

Jamaica Bay.

The item for preliminary examination of Jamaica Bay with a view to obtaining a channel one hundred feet wide and six feet deep to and through Great South Bay to Peconic Bay, including channels to Parsonage and Sumpawans River and Freeport and Massapequa Creeks, in the river and harbor Act approved March second, nineteen hundred and seven, is modified to permit the consideration of a channel of suitable depth and width.

Vol. 34, p. 1115.

Flushing Bay, New York.

The Kill van Kull from Shooters Island west to junction of channels with a view to dredging shoals between channels to provide anchorage grounds.

Bay Ridge Channel, New York Harbor, New York.

Harlem River, New York.

New York Harbor: West side of upper bay from Constable Hook to Ellis Island.

Gardiners Island, New York, with a view to the construction of a breakwater.

Pennsylvania.

Youghiogheny River, Pennsylvania, from its mouth to West Newton, including a report on existing and prospective water terminals.

Maryland.

Harbor at Poplar Island, Maryland.

Virginia-North Carolina.

Northwest River, Virginia-North Carolina: From at or near Woodward's Bridge upstream so flat lighters, and so forth, may ascend, with a width of channel of not less than forty feet, as far as the Cornland Causeway Road, or beyond that point as far as practicable, and to take into consideration any proposition for the cooperation on the part of local or State interests, for the payment of one-half the expense of this project, and to report the possible utility of the whole river, from its mouth to its source, if adequately improved to meet the requirements of its connecting waters, for the national defense.

North Carolina.

Trent River, North Carolina, with a view to deepening the channel along that portion of the river known as Foys Flats, and creating a turning basin at the confluence of Mill Creek and Trent River.

Harbor of Silver Lake, Ocracoke Island, and entrance thereto from Pamlico Sound, North Carolina.

Smiths Creek, Pamlico County, North Carolina.

Broad Creek, Pamlico County, North Carolina.

Queens Creek, Onslow County, North Carolina.

Northeast River, Duplin County, North Carolina.

South Carolina.

Little River, North Carolina and South Carolina.

Lynchs River, South Carolina.

Broad and Congaree Rivers, at or near Columbia, South Carolina, with a view to improvement for navigation, consideration being given to any proposition of local cooperation.

Charleston Harbor and Cooper River, South Carolina, from the entrance to Sanders Creek, including Town Creek Channel.

Church and Bohicket Creeks and Church Flats, South Carolina, from the North Edisto River to the Stono River.

Ashley River, South Carolina, from the Standard Wharf of the Virginia-Carolina Chemical Company to Lambs, with a view of improving the channel to a depth of not less than eight feet.

Georgia.

For the construction of a navigable waterway, of suitable depth and width to answer the needs of commerce, connecting the waters of the Flint and Ocmulgee Rivers in the State of Georgia.

Savannah River at and near Augusta, Georgia, for the purpose of determining what erosion is taking place and what improvements are necessary to prevent the same in the interest of navigation; also the consideration of any proposition for cooperation on the part of local or State interests.

Florida.

Canaveral Harbor, Florida.

Banana Creek, Florida.

Indian and Halifax Rivers, Florida.

Little Sarasota Bay, Florida, from Sarasota Bay to Venice.

Miami Harbor (Biscayne Bay), Florida.

Withlacoochee River, Florida, between Dunnellon and Lake Panasoffkee.

Lake Worth Inlet, Palm Beach County, Florida.

Charlotte Harbor, Florida, with a view to securing a channel of increased depth from the Gulf of Mexico to the town of Boca Grande.

Pithlachascotee River, Florida.

Peace River, Florida.

Braden River, Manatee County, Florida.

Hillsboro River, Florida, from Michigan Avenue to Lafayette Street Bridge, Tampa.

Mississippi.

Back Bay of Biloxi, Mississippi, with a view to removing shoals at Cranes Neck and Biloxi Mud Flats and securing a depth of twelve feet.

Louisiana.

Bayou Tigre, Louisiana.

Atchafalaya River and Bayous Courtableau, Teche, and Vermilion, with a view to forming navigable connections between said streams, including consideration of any propositions for cooperation on the part of local interests.

Bayou Dorcheat, Louisiana, through Lake Bistaneau and Loggy Bayou.

Bayou Terrebonne, Louisiana, between Houma and Thibodaux.

Bayou Lacassine, Louisiana.

Bayou Chene, Louisiana.

Shallow Bayou, Louisiana.

Intracoastal waterway from Calcasieu River, Louisiana, to Sabine River, Texas and Louisiana, with a view to securing such width and depth as will meet the demands of commerce.

Calcasieu River from the Gulf of Mexico to the city of Lake Charles, Louisiana, with a view to providing greater depth of water.

Texas.

Old River, Chambers County, Texas.

Galveston Bay at Smiths Point, Texas.

Channel from Aransas Pass to Corpus Christi, Texas.

Waterway in Texas from the jetties at Sabine Pass through the Port Arthur Ship Channel to Port Arthur and through the Sabine-Neches Canal to the mouths of the Neches and Sabine Rivers, and thence up said rivers to Beaumont and Orange, respectively, and also through Taylors Bayou from the Government turning basin to the Southern Pacific Railway Bridge, with a view to deepening and widening such waterways, making necessary cut-offs, and otherwise improving same for navigation and commerce.

Arkansas and Missouri.

Black River, Arkansas and Missouri.

Black River, Arkansas and Missouri, above Black Rock, Arkansas, an instrumental survey with a view to preparing plans and estimates of cost for caring for flood waters in said river and to determining whether a portion of the flood waters of the Saint Francois River should be diverted to the Black River, and what additional cost such diversion would involve in connection with the works on the Black River. The report of survey shall also include consideration of any proposition by local interests for participation in the expense of said project on account of the reclamation of contiguous lands or other lands subject to overflow by said streams.

Galveston, Tex.

The Secretary of War is hereby authorized and directed to appoint a board of engineers to make a survey of Galveston Island and Galveston Channel, Texas, east of the causeway, and to prepare plans and estimates for their protection against storms and erosions, including the protection of the instrumentalities and aids to commerce located there.

Channel connecting the Houston Ship Channel with the Goose Creek oil field, Harris County, Texas.

Tennessee.

Tennessee River, Tennessee, with a view to locating one low dam at mouth of Whites Creek and one low dam at the mouth of the Clinch River.

Little Tennessee River, Tennessee.

Ohio. Black River at Lorain, Ohio.

Michigan. New Buffalo Harbor, Michigan.

Pentwater Harbor, Michigan.

Wisconsin. Kenosha Harbor, Wisconsin.

Illinois. Bar in Lake Michigan in front of the United States naval training station, Great Lakes, Illinois, with a view to dredging said bar so as to permit lake vessels to land at said station.

Ship canal, Lake Ontario to Saint Lawrence River, N. Y. The Secretary of War is authorized to make such preliminary examinations as can be made from available data, without making field surveys, touching the creation of conditions in or paralleling the Saint Lawrence River from Lake Ontario to the Canadian border suitable in all respects for navigation by ocean-going ships, including such approximate estimate of cost of improvement as can be predicated on such available data and an approximation of the amount of power, if any, that would be incident thereto.

South Dakota. Missouri River between Yankton and Vermilion, South Dakota.

California. Los Angeles Harbor, California, with a view to dredging a channel of adequate width and depth in the West Basin.

Harbor at Newport, California.

Sacramento River, California, from the city of Sacramento to the city of Colusa, with a view to providing a channel six feet in depth.

Petaluma Creek, California.

Oregon. Haydens Slough, Columbia River, near Portland, Oregon, with a view to the relocation of the dike near upper end.

Washington and Oregon. The Secretary of War is directed to make a survey and submit a report to Congress with a view to securing a channel thirty-five feet deep in the Lower Columbia and Willamette Rivers below Portland, Oregon.

Main ship channel in or near the mouth of the Columbia River on the southerly or Oregon side from a point in the vicinity of Point Adams along channel to or a short distance above Tongue Point, and of Youngs Bay from the Columbia River channel to a point one mile above the county bridge, so as to give a depth of forty feet at low tide.

The Secretary of War is directed to make a survey and submit a report to Congress upon the advisability of securing a channel in the Columbia River from the mouth of the Willamette River to the eastern limits of the city of Vancouver, Washington, equal in width and depth to the project channel from the mouth of the Willamette to the city of Portland, Oregon, and what cooperation, if any, should be given.

Columbia River between Carrolls, Washington, and Stella, Washington, and the Cowlitz River below Ostrander, Washington, with a view to devising plans for bank protection, including consideration of any proposition for cooperation on the part of local or State interests.

Willamette Slough, Oregon, with a view to removing old dikes and breakwaters now obstructing navigation.

East Channel, Coos River, Oregon.

Tillamook Bay and River and Hoquarten Slough, Oregon, with a view to securing the most feasible channel from the entrance to the city of Tillamook.

Washington.

Black River and Renton Harbor, Washington.

Mouth of the Cowlitz River, Washington, for the purpose of determining the advisability of the construction of a jetty, or other means, for deepening the channel at the mouth of the river.

Waterway between Port Townsend Bay and Oak Bay in Jefferson County, Washington, with a view to increased width and depth.

Alaska.

Controller Bay, Alaska.

Proviso.
Restriction until close of present war.

Provided, That no survey herein provided for shall be made until after the close of the war with Germany except such as the Secretary of War shall direct.

Minnesota, North and South Dakota.
Improvements of boundary waters by, consented to.

SEC. 5. That Congress hereby consents that the States of Minnesota, North Dakota, and South Dakota, or any two of them, may enter into any agreement or agreements with each other to aid in improving navigation and to prevent and control floods on boundary waters of said States and the waters tributary thereto. And said States, or any two of them, may agree with each other upon any project or projects for the purpose of making such improvements, and upon the amount of money to be contributed by each to carry out such projects. The Secretary of War is authorized and directed to make a survey of any project proposed, as aforesaid, by said States, or any two of them, to determine the feasibility and practicability thereof and the expenses of carrying the same into effect and what share of such expenses should be borne by the respective States, local interests, or by the National Government. If the Secretary of War approves any such projects, he may authorize the States to make such improvements at their own expense, but under his supervision. That the sum of $25,000, or so much thereof as may be necessary, is hereby appropriated, out of any funds in the Treasury of the United States not otherwise appropriated, for the purpose of enabling the Secretary of War to make the surveys and estimates herein contemplated.

Surveys, etc.

Appropriation.

Restriction on private contract work.

SEC. 6. That no part of the funds herein appropriated shall be used to pay for any work done by private contract if the contract price is more than twenty-five per centum in excess of the estimated cost of doing the work by Government plant.

Regulation of harbors, etc.
Vol. 28, p. 362.

SEC. 7. That section four of the river and harbor Act of August eighteenth, eighteen hundred and ninety-four, as amended by section eleven of the river and harbor Act of June thirteenth, nineteen hundred and two, be, and is hereby, amended so as to read as follows:

Use of navigable waters to be regulated by Secretary of War.

Vol. 32, p. 374, amended.

"SEC. 4. That it shall be the duty of the Secretary of War to prescribe such regulations for the use, administration, and navigation of the navigable waters of the United States as in his judgment the public necessity may require for the protection of life and property, or of operations of the United States in channel improvement, covering all matters not specifically delegated by law to some other executive department. Such regulations shall be posted, in conspicuous and appropriate places, for the information of the public; and every person and every corporation which shall violate such regulations shall be deemed guilty of a misdemeanor and, on conviction thereof in any district court of the United States within whose territorial jurisdiction such offense may have been committed, shall be punished by a fine not exceeding $500, or by imprisonment (in the case of a natural person) not exceeding six months, in the discretion of the court."

Posting of regulations.

Punishment for violations.

Regulation of areas adjacent to target practice, fortifications, etc.

SEC. 8. That, in the interest of the national defense and for the better protection of life and property on said waters, the Secretary of War is hereby authorized and empowered to prescribe such regulations as he may deem best for the use and navigation of any portion of areas of the navigable waters of the United States or waters under the jurisdiction of the United States endangered or likely to be endangered by Coast Artillery fire in target practice or otherwise, or by the proving operations of the Government ordnance proving ground at Sandy Hook, New Jersey, or at any Government ordnance proving ground that may be established elsewhere on or near such waters, and of any portion or area of said waters occupied by submarine mines, mine fields, submarine cables, or other material and accessories pertaining to seacoast fortifications; and the said Secretary of War shall have like power to regulate the transportation of explosives upon any of said waters.

Transporting explosives.

Enforcement.

That to enforce the regulations prescribed pursuant to this section the Secretary of War may detail any public vessel in the service of the War Department, or, upon the request of the Secretary of War, the head of any other department may enforce, and the head of any such department is hereby authorized to enforce, such regulations by means of any public vessel of such department.

Proceedings to secure title to lands to be given for improvements by State authorities, etc.

SEC. 9. That whenever any State, or any reclamation, flood control or drainage district, or other public agency created by any State, shall undertake to secure any land or easement therein, needed in connection with a work of river and harbor improvement duly authorized by Congress, for the purpose of conveying the same to the

United States free of cost, and shall be unable for any reason to obtain the same by purchase and acquire a valid title thereto, the Secretary of War may, in his discretion, cause proceedings to be instituted in the name of the United States for the acquirement by condemnation of said land or easement, and it shall be the duty of the Attorney General of the United States to institute and conduct such proceedings upon the request of the Secretary of War: *Provided*, That all expenses of said proceedings and any award that may be made thereunder shall be paid by such State, or reclamation, flood control or drainage district, or other public agency as aforesaid, to secure which payment the Secretary of War may require such State, or reclamation, flood control or drainage district, or other public agency as aforesaid, to execute a proper bond in such amount as he may deem necessary before said proceedings are commenced.

Proviso.
Reimbursement of expenses.

Engineer reports.
Vol. 39, p. 411, amended.

SEC. 10. That section four of the river and harbor Act of July twenty-seventh, nineteen hundred and sixteen, be, and is hereby, amended so as to read as follows:

Index to, 1913 to 1917, ordered printed.
Vol. 37, p. 233.
Additional matter.

"SEC. 4. That there shall be printed one thousand five hundred copies of an index to the annual reports of the Chief of Engineers, United States Army, from nineteen hundred and thirteen to nineteen hundred and seventeen, inclusive, which shall be supplemental to the index published in House Document Numbered Seven hundred and forty, Sixty-third Congress, second session, covering the period from eighteen hundred and sixty-six to nineteen hundred and twelve, inclusive, authorized by section six of the river and harbor Act approved July twenty-fifth, nineteen hundred and twelve, and shall also include an index of congressional documents relating to works of river and harbor improvement which have not been published in the annual reports of the Chief of Engineers, and an index of such other professional papers relating to the work of the Engineer Department as the Chief of Engineers may select for this purpose."

Chicago, Ill.
Report of survey of harbor encroachments required.
Vol. 37, p. 817

SEC. 11. The Secretary of War is hereby directed to report without delay to Congress the survey provided for by the river and harbor Act of nineteen hundred and thirteen relative to the encroachments and obstructions in the Chicago River and all its branches, together with such encroachments as have been made in and along the lake front between Lincoln Park and the Indiana State line.

Seattle, Wash.
Betterton-Morgan Company Inc. may construct dock on tidelands.

SEC. 12. That the Secretary of War is hereby authorized, under such terms, including a reasonable rental, to be approved by him, to permit the Betterton-Morgan Company Inc. to construct a dock or docks upon lots one, two, and three, block six, Seattle tidelands, or upon such portions thereof as he may designate, the construction of said docks to be under supervision of and all material used therein to be approved by the Secretary of War and the necessary expenses of such supervision and

Terms and conditions.

Government use, etc.

construction to be borne by said company. Said company shall maintain said docks at its own expense and use and maintain the same under such regulations as the Secretary of War may prescribe. Said company shall vacate said docks and remove all its property therefrom upon twenty-four hours' notice to do so from the Secretary of War, and it shall give the Secretary of War satisfactory assurances that upon thirty days' notice to do so it will demolish said docks and remove all débris pertaining thereto as may be required by the Secretary of War. Said docks shall from the time of their construction be the property of the United States and subject to the use of the United States for any purpose whatsoever, and the only interest the said company shall have hereunder is a revocable license to use the same under the terms and conditions set out herein.

Rentals for use of Government plants.

SEC. 13. That amounts hereafter paid by private parties or other agencies for rental of plant owned by the Government in connection with the prosecution of river and harbor works shall be deposited in each case to the credit of the appropriation to which the plant belongs.

San Diego, Cal.

Atchison, Topeka and Santa Fe Railway Company may retain wharf at.

Conditions.

Provisos.

Agreement as to disputes.

Improvements, etc., by the Government.

SEC. 14. That the Atchison, Topeka and Santa Fe Railway Company, of Kansas, a corporation created under and by virtue of the laws of the State of Kansas, be, and it is hereby, granted authority to maintain its wharf, known as "long wharf," in the harbor of San Diego, California, where the same extends across certain submerged lands of the United States, ceded to the United States by act of the Legislature of the State of California, approved March ninth, eighteen hundred and ninety-seven, which said submerged lands lie in front of certain upland property of the United States described as lots one to nineteen of block eighteen of the city of San Diego, upon the following conditions and limitations: That the United States shall have free use of the so-called "west wharf" of the said railway company, adjoining and connected with the sand "long wharf" in the harbor of San Diego, under such rules and regulations as may from time to time be agreed upon between the local representatives of the railway company and the commanding officer of Fort Rosecrans, California: *Provided*, That if, at any time, the said parties shall fail to agree as to said rules and regulations, the United States shall have the occupancy and use of said wharf until the controversy shall have been referred to the general manager of the railway company and the department commander, Western Department, United States Army, for decision, and an agreement shall have been reached by them in the matter, or by one of them and an umpire to be selected by them: *Provided further*, That the United States shall have the right to make such improvements to the said "west wharf" at its own expense as may be necessary to give the United States adequate and reasonable accommodations, provided such improvements shall be made without unnecessary interference with the operation of the railway company in its relations to the public as a common carrier and in its use of said wharf as such common carrier: *And provided further*, That the railway company shall not be required to add to or alter the said "west wharf" or to add to or alter the warehouse and storeroom accommodations connected therewith. The right to alter, amend, or repeal this section is hereby expressly reserved.

Alterations, etc., by railway company not required.

Mosquito Creek, S. C.
Declared nonnavigable.

SEC. 15. That Mosquito Creek, in Colleton County, South Carolina, be, and the same is hereby, declared to be a nonnavigable stream within the meaning of the Constitution and laws of the United States.

Bayo Meto, Ark.
Declared nonnavigable.

SEC. 16. That Bayou Meto, in the State of Arkansas, be, and the same is hereby, declared to be a nonnavigable stream within the meaning of the Constitution and laws of the United States.

Saint Marys River, Ohio and Ind.
Declared nonnavigable.

SEC. 17. That Saint Marys River, Ohio and Indiana, be, and the same hereby is, declared to be a nonnavigable sueam within the meaning of the Constitution and laws of the United States.

Waterways Commission.
Composition of.

SEC. 18. That a commission, to be known as the Waterways Commission, consisting of seven members to be appointed by the President of the United States, at least one of whom shall be chosen from the active or retired list of the Engineers Corps of the Army, at least one of whom shall be an expert hydraulic engineer from civil life, and the remaining five of whom may each be selected either from civil life or the public service, is hereby created and authorized, under such rules and regulations as the President may prescribe, and subject to the approval of the heads of the several executive departments concerned, to bring into coordination and cooperation the engineering, scientific, and constructive services, bureaus, boards, and commissions of the several governmental departments of the United States and commissions created by Congress that relate to study, development, or control of waterways and water resources and subjects related thereto, or to the development and regulation of interstate and foreign commerce, with a view to uniting such services in investigating, with respect to all watersheds in the United States, questions relating to the development, improvement, regulation, and control of navigation as a part of interstate and foreign commerce, including therein the related questions of irrigation, drainage, forestry, arid and swamp land reclamation, clarification of streams, regulation of flow, control of floods, utilization of water power, prevention of soil erosion and waste, storage, and conservation of water for agricultural, industrial, municipal, and domestic uses, cooperation of railways and waterways,

Created to formulate plans for developing water resources for navigation, etc.

Subjects for study, etc., designated.

Report of plans to Congress.

Compensation of commission.

and promotion of terminal and transfer facilities, to secure the necessary data, and to formulate and report to Congress, as early as practicable, a comprehensive plan or plans for the development of waterways and the water resources of the United States for the purposes of navigation and for every useful purpose, and recommendations for the modification or discontinuance of any project herein or heretofore adopted. Any member appointed from the retired list shall receive the same pay and allowances as he would if on the active list, and no member selected from the public service shall receive additional compensation for services on said commission, and members selected from civil life shall receive compensation of $7,500 per annum.

Consideration of rights, etc., of United States, States, etc., respecting proposed projects.

In all matters done, or to be done, under this section relating to any of the subjects, investigations, or questions to be considered hereunder, and in formulating plans, and in the preparation of a report or reports, as herein provided, consideration shall be given to all matters which are to be undertaken, either independently by the United States or by cooperation between the United States and the several States, political subdivisions thereof, municipalities, communities, corporations, and individuals within the jurisdiction, powers, and rights of each, respectively, and with a view to assigning to the United States such portion of such development, promotion, regulation, and control as may be undertaken by the United States, and to the States, political subdivisions thereof, municipalities, communities, corporations, and individuals such portions as belong to their respective jurisdictions, rights, and interests.

Engineers, technical experts, etc., to be employed.

Appropriation for expenses.

The commission is authorized to employ, or retain, and fix the compensation for the services of such engineers, transportation experts, experts in water development and utilization, and constructors of eminence as it may deem necessary to make such investigations and to carry out the purposes of this section. And in order to defray the expenses made necessary by the provisions of this section there is hereby authorized to be appropriated such sums as Congress may hereafter determine, and the sum of $100,000 is hereby appropriated, available until expended, to be paid out upon warrants drawn on the Secretary of the Treasury by the chairman of said commission.

Authority for expenditures.

The commission shall have power to make every expenditure requisite for and incident to its authorized work, and to employ in the District of Columbia and in the field such clerical, legal, engineering, artistic, and expert services as it may deem advisable, including the payment of per diem in lieu of subsistence for employees engaged in field work or traveling on official business, rent of offices in the District of Columbia and in the field, and the purchase of books, maps, and office equipment.

River and harbor projects not interfered with, etc.

Nothing herein contained shall be construed to delay, prevent, or interfere with the completion of any survey, investigation, project, or work herein or heretofore or hereafter adopted or authorized upon or for the improvement of any of the rivers or harbors of the United States or with legislative action upon reports heretofore or hereafter presented.

Approved, August 8, 1917.

September 19, 1917.
[S. 2785.]
[Public, No. 42.]

CHAP. 54.—An Act To authorize and empower the Southwest Louisiana Waterways Association, of the State of Louisiana, to construct a lock and dam in Mermentau River, in the State of Louisiana.

Mermentau River, La.
Southwest Louisiana Waterways Association may build lock and dam in.
Provisos.
Construction expenses.
No toll allowed.
Operation under Army officer.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted for the Southwest Louisiana Waterways Association, of the State of Louisiana, to construct a lock and dam in the Mermentau River at some suitable point, to be approved by the Secretary of War: *Provided*, That said lock and dam shall be constructed and maintained wholly at the expense of said Association and in accordance with plans and specifications approved by the Chief of Engineers and the Secretary of War: *Provided further*, That no toll shall be imposed at any time for the passage of any craft through said lock: *And provided further*, That the operation and care of said lock and dam, with funds provided by the association, may, in the discretion of the Secretary of War, be assigned to the engineer officer of the United States Army in charge of the locality.

Commencement.
Proviso.
Use limited.

SEC. 2. That this Act shall be null and void unless the privilege hereby granted shall be availed of within two years from the date hereof: *Provided*, That no dam constructed under the consent hereby granted shall be used to develop water power, nor to generate electricity, but the use of the dam by the construction shall be limited to irrigation.

Amendment.

SEC. 3. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, September 19, 1917.

September 19, 1917.
[S. J. Res. 93.]
[Pub. Res., No. 11.]

CHAP. 55.—Joint Resolution For improving Willapa Harbor and River, Washington.

Willapa Harbor and River, Wash.
Construction of improvement work authorized.
Vol. 39, p. 405.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War may proceed with the work of improving Willapa Harbor and River, Washington, in accordance with the authorization in the river and harbor Act of July twenty-seventh, nineteen hundred and sixteen, provided he is assured that the city of Raymond and other local interests will contribute the sum of $71,775, being one-half the actual estimated cost of dredging in the North and South Forks of the Willapa River above their junction and will comply with all the other conditions of cooperation imposed by the said Act.

Approved, September 19, 1917.

September 25, 1917.
[S. 2830.]
[Public, No. 44.]

CHAP. 57.—An Act Extending the time for the construction of a bridge across the Arkansas River between the cities of Little Rock and Argenta, Arkansas.

Arkansas River, Ark.
Time extended for bridging, by Pulaski County.
Vol. 38, p. 685, amended.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the times for commencing and completing the construction of a bridge, authorized by Act of Congress approved August seventh, nineteen hundred and fourteen, to be built across the Arkansas River between the cities of Little Rock and Argenta, Arkansas, are hereby extended one and three years, respectively, from the date hereof.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, September 25, 1917.

September 27, 1917.
[S. 2477.]
[Public, No. 45.]

CHAP. 58.—An Act To authorize the construction of a building for the use of the Treasury Department.

Public buildings.
Additional building for Treasury Department, Washington, D. C., authorized.
Location.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Treasury be, and he is hereby, authorized and directed to cause to be constructed, upon land belonging to the United States, at the northeast corner of Pennsylvania Avenue and Madison Place, in the city of Washington, District of Columbia, a suitable building, complete, for the use of the Treasury Department, and to cause an underground connection of said building with the Treasury building to be constructed; and the Secretary of the Treasury is hereby authorized and empowered to enter into the necessary contracts at a total limit of cost for said building and underground connection of not to exceed $1,250,000.

Contracts.
Limit of cost.

Technical, etc., services authorized.

SEC. 2. That the Secretary of the Treasury is hereby further authorized, without regard to civil-service laws, rules, or regulations, to obtain such special architectural or other expert technical services as he may deem necessary and specially order in writing, and to pay for such services such prices or rates of compensation as he may consider just and reasonable from the appropriation for said building, any statute to the contrary notwithstanding.

Approved, September 27, 1917.

September 28, 1917. [H. R. 5835.]

[Public, No. 46.]

CHAP. 59.—An Act To extend the time for constructing a bridge across the Tug Fork of the Big Sandy River near Warfield, Kentucky, and Kermit, West Virginia, authorized by an Act approved January twenty-eighth, nineteen hundred and sixteen.

Tug Fork of Big Sandy River, Ky. and W. Va. Time extended for bridging, by Interstate Bridge Company. Vol. 39, p. 7, amended.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the times for commencing and completing the construction of a bridge authorized by the Act of Congress approved January twenty-eighth, nineteen hundred and sixteen, to be built across the Tug Fork of the Big Sandy River near Warfield, Kentucky, and Kermit, West Virginia, are hereby extended to one year and three years, respectively, from the twenty-eighth day of January, nineteen hundred and seventeen.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, September 28, 1917.

October 1, 1917. [H. R. 5431.]

[Public, No. 47.]

CHAP. 60.—An Act To authorize the construction, maintenance, and operation of a bridge across the Saline River, at or near Suttons Ferry, Arkansas.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Bradley, a corporation organized and existing under the laws of the State of Arkansas, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Saline River, at or near Suttons Ferry in the southwest quarter of the northwest quarter of section fifteen, township thirteen south, range nine west, of the fifth principal meridian on the Warren and Monticello Road, at a point suitable to the interests of navigation, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Saline River. Bradley County, Ark., may bridge, Suttons Ferry. Construction. Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, October 1, 1917.

October 5, 1917. [S. 2813.]

[Public, No. 51.]

CHAP. 64.—An Act To authorize the Gulf Ports Terminal Railway Company, a corporation existing under the laws of the State of Florida, to construct a bridge over and across the headwaters of Mobile Bay and such navigable channels as are between the east side of the Bay and Blakely Island, in Baldwin and Mobile Counties, Alabama.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress as-

Mobile Bay. Gulf Ports Terminal Railway Company may bridge, Mobile, Ala.

sembled, That the Gulf Ports Terminal Railway Company, a corporation existing under the laws of the State of Florida, be, and is hereby, authorized to construct, operate, and maintain a bridge or bridges and trestles over and across the navigable channels of the mouth of Mobile River from Bay Port, in township four south, range two east, on the east shore of the waters of Mobile Bay, in Baldwin County, Alabama, on a direct line, to a point on Blakely Island, in Mobile County, on the east shore of Mobile River, opposite the municipal docks of the city of Mobile, Alabama, at a point or points suitable to the interests of navigation, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction. Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, and repeal this Act is hereby expressly reserved.

Approved, October 5, 1917.

October 5, 1917.
[S. 2816.]
[Public, No. 52.]

CHAP. 65.—An Act Granting the consent of Congress to the Gainesville Red River Bridge Company to construct a bridge across Red River.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Gainesville Red River Bridge Company, or its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Red River at Sacras Ferry, Cooke County, Texas, and Love County, Oklahoma, at a point suitable to the interests of navigation, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Red River. Gainesville Red River Bridge Company may bridge.

Location.

Construction. Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, October 5, 1917.

October 5, 1917.
[S. 2823.]
[Public, No. 53.]

CHAP. 66.—An Act Granting the consent of Congress to the city of Elgin, Illinois, to construct, maintain, and operate a bridge across the Fox River at Elgin.

Fox River. Elgin, Ill., may bridge.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the city of Elgin, Illinois, to construct, maintain, and operate a bridge and approaches thereto across the Fox River from the westerly end of Kimball Street to the easterly end of Lawrence Avenue, in the city of Elgin, in the county of Kane, in the State of Illinois, at a point suitable to the interests of navigation, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, October 5, 1917.

October 5, 1917. [H. R. 5839.] [Public, No. 54.]

CHAP. 67.—An Act Extending the time for the construction of a bridge across the Mississippi River in Aitkin County, Logan Township, State of Minnesota.

Mississippi River. Time extended for bridging, in Aitkin County, Minn. Vol. 39, p. 724, amended.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the times for commencing and completing the construction of a bridge, authorized by Act of Congress approved September fifth, nineteen hundred and sixteen, to be built across the Mississippi River at its intersection with the division line between sections twenty-six and twenty-seven, township forty-nine north, range twenty-five west, fourth principal meridian, in the county of Aitkin, Logan Township, in the State of Minnesota, are hereby extended one and three years, respectively, from the date hereof.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, October 5, 1917.

October 5, 1917. [S. 2434.] [Public, No. 57.]

CHAP. 70.—An Act Authorizing the counties of Cass and Itasca, Minnesota, to construct a bridge across the Mississippi River between said counties.

Mississippi River. Cass and Itasca Counties may bridge.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the counties of Cass and Itasca, in the State of Minnesota, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Mississippi River at a point suitable to the interests of navigation on or near the line between townships one hundred and forty-four and one hundred and forty-five north, range twenty-six west, fifth principal meridian, in the State of Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Location.

Construction. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, October 5, 1917.

October 5, 1917.
[S. 2435.]
[Public, No. 58.]

CHAP. 71.—An Act Authorizing the counties of Itasca and Cass, Minnesota, to construct a bridge across the Mississippi River in said counties.

Mississippi River.
Itasca and Cass Counties may bridge.
Location.
Construction.
Vol. 34, p. 84.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the counties of Itasca and Cass, in the State of Minnesota, be, and they are hereby, authorized to construct, maintain, and operate a highway bridge and approaches thereto across the Mississippi River at a point suitable to the interests of navigation in township one hundred and forty-four north, on or near the range line between ranges twenty-five and twenty-six west, fifth principal meridian, in the State of Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, October 5, 1917.

October 5, 1917.
[S. 2710.]
[Public, No. 59.]

CHAP. 72.—An Act Granting the consent of Congress to Webbers Falls Railroad Company, a corporation, its successors and assigns, to construct a bridge across the Arkansas River, between the towns of Webbers Falls and Gore, in the State of Oklahoma.

Arkansas River.
Webbers Falls Railroad Company may bridge, Webbers Falls, Okla.
Construction.
Vol. 34, p. 84.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to Webbers Falls Railroad Company, a corporation, and its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Arkansas River, at a point suitable to the interests of navigation, at or near the town of Webbers Falls, in the county of Muskogee, in the State of Oklahoma, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, October 5, 1917.

October 5, 1917.
[S. 2878.]
[Public, No. 60.]

CHAP. 73.—An Act Granting the consent of Congress to The Whiteville Lumber Company to construct a bridge across Waccamaw River.

Waccamaw River.
Whiteville Lumber Company may bridge, Pireway Ferry, N. C.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to The Whiteville Lumber Company and its successors and assigns to construct, maintain, and operate a bridge and approaches thereto across Waccamaw River at a point suitable to the interests of navigation at or near Pireway Ferry, in the counties of Columbus and Brunswick, in the State of North Carolina, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction.
Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, October 5, 1917.

October 6, 1917.
[S. 2774.]
[Public, No. 63.]

CHAP. 78.—An Act Granting the consent of Congress to the Gilmer-Pittsburgh Coal Company to construct a bridge across the Little Kanawha River.

Little Kanawha River.
Gilmer-Pittsburgh Coal Company may bridge, Gilmer, W. Va.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Gilmer-Pittsburgh Coal Company, or its successor and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Little Kanawha River at a point suitable to the interest of navigation, at or near Gilmer Station on the Coal and Coke Railway, in the County of Gilmer, in the State of West Vrginia, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction.
Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, October 6, 1917.

October 6, 1917.
[H. R. 5949.]
[Public, No. 64.]

CHAP. 79.—An Act Making appropriations to supply urgent deficiencies in appropriations for the fiscal year ending June thirtieth, nineteen hundred and eighteen, and prior fiscal years, on account of war expenses, and for other purposes.

Deficiencies appropriations for war expenses, etc.
Ante, p. 182.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, to supply urgent deficiencies in appropriations for the fiscal year ending June thirtieth, nineteen hundred and eighteen, and prior fiscal years, on account of war expenses, and for other purposes, namely:

* * * * *

DISTRICT OF COLUMBIA.

District of Columbia.

* * * * *

Calvert Street Bridge.
Balance available.
Vol. 39, p. 689.

Bridges: The appropriation for preparation of plans for construction of a bridge to take the place of the existing Calvert Street Bridge crossing Rock Creek, fiscal year nineteen hundred and seventeen, is continued available during the fiscal year nineteen hundred and eighteen.

Benning Road Viaduct.
Vol. 38, p. 1141.

Benning Road Viaduct and Bridge: For an additional amount for the objects set forth in the appropriation contained in the District of Columbia appropriation Act for the fiscal year nineteen hundred and fifteen, for constructing a suitable viaduct and bridge to carry Benning Road over the tracks of the Philadelphia, Baltimore and Washington Railroad Company, $50,000.

Highway Bridge.

Highway Bridge across Potomac River: For lighting, power, and miscellaneous supplies, and expenses of every kind necessarily incident to the operation and maintenance of the bridge and approaches, $4,000.

Playgrounds.
New swimming pools.
Vol. 39, p. 691.

PLAYGROUNDS: For the construction of two swimming pools, shower baths, appurtenances, and equipment, on sites to be selected by the commissioners, the appropriation contained in the District of Columbia appropriation Act for the fiscal year nineteen hundred and seventeen is continued available during the fiscal year nineteen hundred and eighteen with the additional sum of $5,000.

* * * * *

Washington Aqueduct.
Maintenance, etc.
From water revenues.

WASHINGTON AQUEDUCT: For operation, including salaries of all necessary employees, maintenance, and repair of Washington Aqueduct and its accessories, McMillan Park Reservoir, Washington Aqueduct tunnel, the Filtration Plant, the plant for the preliminary treatment of the water supply, authorized water meters on Federal services, vehicles, and for each and every purpose connected therewith, $64,000, to be paid out of the revenues of the water department.

War Department.

WAR DEPARTMENT.

TEMPORARY EMPLOYEES.

Additional temporary clerks, etc.

For the temporary employment of such additional force of clerks and other employees as in the judgment of the Secretary of War may be proper and necessary to the prompt, efficient, and accurate dispatch of official business in the War Department and its bureaus, to be allotted by the Secretary of War to such bureaus and offices as the exigencies of the existing situation may demand, $4,261,232: *Provided*, That the Secretary of War shall submit to Congress on the first day of its next regular session a statement showing by bureaus or offices the number and designation of the persons employed hereunder and the annual rate of compensation paid to each: *Provided further*, That not more than thirty persons shall be employed hereunder at a rate of compensation in excess of $1,800 per annum each and not exceeding $2,400 per annum each.

Provisos.
Detailed statement to be submitted.
Limitation on higher compensations.

CONTINGENT EXPENSES.

Contingent expenses.

For purchase of professional and scientific books, law books, including their exchange; books of reference, blank books, pamphlets, periodicals, newspapers, maps; typewriters and adding machines; furniture and repairs to same; carpets, matting, oilcloth, file cases, towels, ice, brooms, soap, sponges, fuel, gas, and heating apparatus for and repairs to buildings (outside of the State, War, and Navy Department Building) occupied by Adjutant General's Office and other offices of the War Department and its bureaus located in the Lemon Building and other buildings; purchase, exchange, care, and subsistence of horses, and the purchase, maintenance, repair, and exchange of wagons, motor trucks, and horse-drawn passenger-carrying vehicles, and harness, to be used only for official purposes; freight and express charges; street car tickets, not exceeding $300; and other absolutely necessary expenses, including a per diem allowance not to exceed $4 in lieu of subsistence, $400,000.

Stationery.

For stationery for the department and its bureaus and offices, $300,000.

* * * * *

MILITARY POSTS.

Military posts.

* * * * *

Fort Riley, Kans.
Bridge across Republican River.
Vol. 39, p. 644.
Balance available.

Bridge across the Republican River near Fort Riley, Kansas: For the completion of the bridge across the Republican River near Fort Riley, Kansas, according to the terms and upon the conditions of the Act making appropriations for the support of the Army for the fiscal year ending June thirtieth, nineteen hundred and seventeen, $15,000, and the $30,000 heretofore appropriated for said purpose is continued and made available for the fiscal year nineteen hundred and eighteen.

* * * * *

MILITARY ESTABLISHMENT.

Army.

* * * * *

OFFICE OF THE CHIEF OF STAFF.

Chief of Staff.

Military information section, office of.

Military Information Section: For contingent expenses of the military information section, General Staff Corps, including the purchase of law books, professional books of reference; periodicals and newspapers; drafting and messenger service; and of the military attachés at the United States embassies and legations abroad; and of the branch office of the military information section at Manila; the cost of special instruction at home and abroad and in maintenance of students and attachés; and for such other purposes as the Secretary of War may deem proper; to be expended under the direction of the Secretary of War, $489,000.

* * * * *

Pay of the Army.

PAY OF THE ARMY.

* * * * *

Corps of Engineers.

Corps of Engineers: For pay of officers of the Corps of Engineers, $6,500,000.

* * * * *

Transportation.

Travel allowances, etc., on discharge.
Vol. 39, p. 217.

National Guard officers on discharge.
Vol. 31, p. 903.

Per diem subsistence.

Transportation of the Army and its supplies: For transportation of the Army and its supplies, including transportation of the troops when moving either by land or water, and of their baggage, including members of the Officers' Reserve Corps, enlisted men of the Enlisted Reserve Corps, and retired enlisted men when ordered to active duty, including the cost of packing and crating: for transportation of recruits and recruiting parties; of applicants for enlistment between recruiting stations and recruiting depots; for traveling allowance to officers and enlisted men on discharge; for payment of travel allowance as provided in section one hundred and twenty-six of the Act approved June third, nineteen hundred and sixteen, to enlisted men of the National Guard on their discharge from the service of the United States, and to members of the National Guard who have been mustered into the service of the United States and discharged on account of physical disability; for payment of travel pay to officers of the National Guard on their discharge from the service of the United States, as prescribed in the Act approved March second, nineteen hundred and one; for travel allowance to persons on their discharge from the United States disciplinary barracks or from any place in which they have been held under a sentence of dishonorable discharge and confinement for more than six months, or from Saint Elizabeth's Hospital after transfer thereto from such barracks or place, to their homes (or elsewhere as they may elect), provided the cost in each case shall not be greater than to the place of last enlistment; of the necessary agents and other employees, including per diem allowances in lieu of subsistence not exceeding $4 for those authorized to receive the per diem allowance; of clothing and equipment and other quartermaster stores from Army depots or places of purchase or delivery to the several posts and Army depots and from those depots to the troops in the field; of horse equipment; of ordnance and ordnance stores, and small arms from the foundries and armories to the arsenals, fortifications, frontier posts, and Army depots; for payment of wharfage, tolls, and ferriages; for transportation of funds of the Army; for the hire of employees; for the payment of Army transportation lawfully due such land-grant railroads as have not received aid in Government bonds (to be adjusted in accordance with the decisions of the Supreme Court in cases decided under such land-grant Acts), but in no case shall more than fifty per centum of full amount of service be paid: *Provided*, That such compensation shall be computed upon the basis of the tariff or lower special rates for like transportation performed for the public at large and shall be accepted as in full for all demands for such service: *Provided further*, That in expending the money appropriated by this Act a railroad company which has not received aid in bonds of the United States, and which obtained a grant of public land to aid in the construction of its railroad on condition that such railroad should be a post route and military road, subject to the use of the United States for postal, military, naval, and other Government services, and also subject to such regulations as Congress may impose restricting the charge for such Government transportation, having claims against the United States for transportation of troops and munitions of war and military supplies and property over such aided railroads, shall be paid out of the moneys appropriated by the foregoing provision only on the basis of such rate for the transportation of such troops and munitions of war and military supplies and property as the Secretary of War shall deem just and reasonable under the foregoing provision, such rate not to exceed fifty per centum of the compensation for such Government transportation as shall at that time be charged to and paid by private parties to any such company for like and similar transportation; and the amount so fixed to be paid shall be accepted as in full for all demands for such service: *And provided further*, That nothing in the preceding provisos shall be construed to prevent the accounting officers of the Government from making full payment to land-grant railroads for transportation of property or persons where the courts of the United States have held that such property or persons do not come within the scope of the deductions provided for in the land-grant Acts; for the purchase and hire of draft and pack animals in such numbers as are actually required for the service, including reasonable provision for replacing unserviceable animals; for the purchase, hire, operation, maintenance, and repair of such harness, wagons, carts, drays, other vehicles, and motor-propelled and horse-drawn passenger-carrying vehicles, as are required for the transportation of troops and supplies, and for official, military, and garrison purposes; for drayage and cartage at the several depots; for the hire of teamsters and other employees; for the purchase and re-

Payment to land-grant roads.

Provisos.
Basis of computation.

Fifty per cent to roads not bond aided.

Full pay to excepted roads.

Draft and pack animals.

Vehicles.

Ships, boats, etc.

Transports.

pair of ships, boats, and other vessels required for the transportation of troops and supplies and for official, military, and garrison purposes; for expenses of sailing public transports and other vessels on the various rivers, the Gulf of Mexico, and the Atlantic and Pacific Oceans, $375,000,000.

Travel expenses of foreign officers and enlisted men attached to the Army allowed herefrom.

The Secretary of War is hereby authorized, under such regulations and in such manner as he may prescribe, to employ such portion of the appropriations made for transportation of the Army and its supplies as in his judgment may be necessary to defray the expenses of travel incurred by officers and enlisted men of foreign armies attached to the Army of the United States during the present emergency, and that those officers and enlisted men, who may have been performing duties in this connection, be reimbursed from this appropriation for the expenditures they have already been obliged to make.

Pay to certain land-grant railroads.

Vol. 14, p. 338.

Vol. 12, p. 772.

Vol. 14, p. 292.

Proviso.

Restriction.

Land-grant railroads organized under the Act of July twenty-eighth, eighteen hundred and sixty-six, chapter three hundred, shall receive the same compensation for transportation during the existing war emergency of property and troops of the United States as may be paid to land-grant railroads, organized under the land-grant Act of March third, eighteen hundred and sixty-three, and the Act of July twenty-seventh, eighteen hundred and sixty-six, chapter two hundred and seventy-eight, for such transportation during said emergency: *Provided*, That this paragraph shall not be construed as changing in any other way or for any other period of time the rights and duties of the land-grant railroads first above mentioned.

* * * * *

Horses.

Purchases of, etc.

Provisos.

Limitations.

Open market purchases.

HORSES FOR CAVALRY, ARTILLERY, AND ENGINEERS: For the purchase of horses of ages, sex, and size as may be prescribed by the Secretary of War for remounts, for officers entitled to public mounts for the Cavalry, Artillery, Signal Corps, and Engineers, the United States Military Academy, service schools, and staff colleges, and for the Indian scouts, and for such Infantry and members of the Medical Department in field campaigns as may be required to be mounted, and the expenses incident thereto, and for the hire of employees: *Provided*, That the number of horses purchased under this appropriation, added to the number now on hand, shall be limited to the actual needs of the mounted service, including reasonable provisions for remounts, and, unless otherwise ordered by the Secretary of War, no part of this appropriation shall be paid out for horses not purchased by contract after competition duly invited by the Quartermaster Corps and an inspection under the direction and authority of the Secretary of War. When practicable, horses shall be purchased in open market at all military posts or stations, when needed, at not exceeding a maximum price to be fixed by the Secretary of War: *Provided further*, That no part of this appropriation shall be expended for the purchase of any horse below the standard set by Army Regulations for Cavalry and Artillery horses, except when purchased as remounts or for instruction of cadets at the United States Military Academy: *And provided further*, That no part of this appropriation shall be expended for polo ponies except for West Point Military Academy, and such ponies shall not be used at any other place, $40,000,000.

Standard required.

Polo ponies.

* * * * *

ENGINEER DEPARTMENT.

Engineer Department.

MILITARY SURVEYS AND MAPS: For the execution of topographic or other surveys, the securing of such extra topographic data as may be required, and the preparation and printing of maps required for military purposes, $500,000: *Provided*, That the Secretary of War is authorized to secure the assistance, wherever practicable, of the United States Geological Survey, the Coast and Geodetic Survey, or other mapping agencies of the Government in this work, and to allot funds therefor to them from this appropriation.

Military surveys and maps.

Proviso.
Other Government officials to assist.

ENGINEER EQUIPMENT OF TROOPS: For pontoon material, tools, instruments, supplies, and appliances required for use in the engineer equipment of troops, for military surveys, and for engineer operations in the field, including the purchase, maintenance, operation, and repair of the necessary motorcycles; the purchase and preparation of engineer manuals and procurement of special paper for same, and for a reserve supply of above equipment, $12,100,000.

Equipment of troops.

ENGINEER OPERATIONS IN THE FIELD: For expenses incident to military engineer operations in the field, including the purchase of material and a reserve of material for such operations, the construction or rental of storehouses within and outside the District of Columbia, the purchase, operation, maintenance, and repair of horse-drawn and motor-propelled passenger-carrying vehicles, and such expenses as are ordinarily provided for under appropriations for "Engineer depots," "Civilian assistants to engineer officers," and "Maps, War Department," $186,000,000.

Field operations expenses.

* * * * *

PUBLIC BUILDINGS AND GROUNDS.

Public buildings and grounds, D. C.

Park watchmen: For additional park watchmen from October first, nineteen hundred and seventeen, to June thirtieth, nineteen hundred and eighteen, inclusive, at annual rates of compensation, as follows: Second ser-

Additional park watchmen, etc.

geant of park watchmen, $900; eighteen park watchmen for duty at the Highway Bridge, District of Columbia, at $840 each; in all, $12,015.

For purchase and repair of bicycles and revolvers for park watchmen and for purchase of ammunition, $316.

For purchasing and supplying uniforms to park, monument, and bridge watchmen, $950.

Half from District revenues.

Of the foregoing amounts appropriated under public buildings and grounds, the sum of $6,640.50 shall be paid out of the revenues of the District of Columbia.

Henry Park. Temporary buildings for War and Navy Departments in.

For temporary office buildings, including heating and lighting, for the use of the War and Navy Departments to contain approximately one million and fifty-five thousand square feet, to be erected under the direction of the Secretary of War in Henry Park, reservation numbered four, Sixth and B Streets, $2,000,000. Space in said building shall be allotted by the officer in charge of Public Buildings and Grounds upon the joint order of the Secretary of War and the Secretary of the Navy: *Provided*, That within two years after the conclusion of the existing war, the land above referred to shall again be reserved for the erection of the George Washington Memorial Hall.

Proviso. George Washington Memorial Hall.

* * * * *

Interior Department.

DEPARTMENT OF THE INTERIOR.

* * * * *

Saint Elizabeths Hospital, D. C.

SAINT ELIZABETHS HOSPITAL.

* * * * *

Permit to use reclaimed, Anacostia Flats lands.

The Secretary of War is authorized to grant a revocable permit to the Saint Elizabeths Hospital for the use of such portions of land as are at present not under lease and such other portions thereof as leases thereof expire, of that portion of land lying along Anacostia Flats which has been reclaimed by the War Department and is valuable for farming purposes.

* * * * *

Approved, October 6, 1917.

October 6, 1917.
[S. 2883.]
[Public, No. 66.]

CHAP. 81.—An Act Making further provision for the allotment of pay officers, enlisted men, and civilian employees of the Army, and for other purposes.

Army.
Vol. 30, p. 981, amended.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section sixteen of the Act of Congress approved March second, eighteen hundred and ninety-nine, entitled "An Act for increasing the efficiency of the Army of the United States, and for other purposes," as amended by the Act of March second, nineteen hundred and one, be, and the same is hereby, amended as follows:

Vol. 31, p. 896.

"The Secretary of War is hereby authorized to permit, under such regulations as he may prescribe, any officer or enlisted man on the active list of the Army, any retired officer or enlisted man of the Army on active duty, and any permanent civilian employee under the jurisdiction of the War Department on duty outside of the continental limits of the United States, to make allotments of his pay for the support of his wife, children, or dependent relatives, or for such other purposes as the Secretary of War may deem proper. All allotments of pay of officers, enlisted men, and civilian employees that have been or shall be paid to designated allottees previous to the receipt by disbursing officer of notice of discontinuance of the same from the officer required by regulations to furnish such notice shall pass to the credit of the disbursing officer who has made or shall make such payments; and, if erroneous payment is made because of the failure of an officer to report, in the manner prescribed by the Secretary of War, the death of the grantor, or any fact which renders the allotment not payable, then the amount of such erroneous payment shall be collected by the Quartermaster General from the officer who fails to make such report, if such collection is practicable. Nothing herein shall be construed to invalidate allotments now in force."

Allotment of pay.

Extended to officers and enlisted men on active duty and civilians in military service abroad.

Credit allowed for payments to designated allottees prior to notice of discontinuance.

Collection of erroneous payments.

Existing allotments valid.

Approved, October 6, 1917.

CHAP. 82.—An Act To authorize the construction, maintenance, and operation of a bridge across Little River, in Poinsett County, Arkansas, at or near the section line between sections thirty-five and thirty-six, township eleven north, range six east.

October 6, 1917.
[S. 2938.]
[Public, No. 67.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Poinsett County, Arkansas, is hereby authorized to construct, maintain, and operate a bridge and approaches thereto across Little River, a tributary to Saint Francis River, at a point suitable to the interests of navigation, at or near the section line between sections thirty-five and thirty-six, township eleven north, range six east, fifth principal meridian, in Poinsett County, in the State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Little River.
Poinsett County, Ark., may bridge.

Location.

Construction.
Vol. 34, p. 84

Sec. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment

Approved, October 6, 1917.

October 6, 1917.
[H. R. 4282.]

[Public, No. 69.]

CHAP. 84.—An Act Extending the time for the construction of a bridge across Flint River, in the State of Georgia.

Flint River.
Time extended for bridging, by Mitchell County or Baker County, Ga.
Vol. 39, p. 52, amended.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the times for commencing and completing the construction of a bridge authorized by Act of Congress approved April seventeenth, nineteen hundred and sixteen, to be built across the Flint River, Georgia, by Mitchell County, or by Baker County, Georgia, jointly or separately, are hereby extended one and three years, respectively, from the date hereof.

Amendment.

Sec. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, October 6, 1917.

October 6, 1917.
[H. R. 6810.]

[Public, No. 75.]

CHAP. 90.—An Act Granting the consent of Congress to the Trumbull Steel Company, its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Mahoning River, in the State of Ohio.

Mahoning River.
Trumbull Steel Company may bridge, Warren, Ohio.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Trumbull Steel Company and its successors and assigns, to construct, maintain, and operate, at a point suitable to the interests of navigation, a bridge and approaches thereto across the Mahoning River, near the city of Warren, in the county of Trumbull, in the State of Ohio, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction.
Vol. 34, p. 84.

Amendment.

Sec. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, October 6, 1917.

October 6, 1917.
[S. 2663.]

[Public, No. 81.]

CHAP. 96.—An Act Granting the consent of Congress to the Wolf Creek Lumber Company to maintain a bridge already constructed across Tug River.

Tug River.
Wolf Creek Lumber Company may operate, etc., bridge across, Kermit, W. Va.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Wolf Creek Lumber Company, and its successors and assigns, to maintain and operate, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six, a bridge and approaches thereto already constructed across the Tug River at or near Wolf Creek near Kermit, West Virginia, in the county of Mingo, in the State of West

Construction approved.

Vol. 34, p. 84.

Virginia, which bridge is hereby declared to have been constructed in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, October 6, 1917.

October 6, 1917.
[S. 2937.]
[Public, No. 84.]

CHAP. 99.—An Act Granting the consent of Congress for the construction of a bridge and approaches thereto across the Arkansas River between the cities of Little Rock and Argenta.

Arkansas River.
Pulaski County, Ark., may bridge, Little Rock.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted for the county of Pulaski, in the State of Arkansas, its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Arkansas River at the city of Little Rock on the site now occupied by the free highway bridge constructed by said county in the years eighteen hundred and ninety-six and eighteen hundred and ninety-seven, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction.
Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, October 6, 1917.

October 6, 1917.
[S. 2947.]
[Public, No. 85.]

CHAP. 100.—An Act Granting the consent of Congress to the city of El Paso, Texas, to construct a bridge across the Rio Grande River within or near the city limits of El Paso, Texas, such construction to be made with the consent and cooperation of the Republic of Mexico.

Rio Grande River.
El Paso, Tex., may bridge.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the city of El Paso, in the State of Texas, to construct, maintain, and operate a bridge and approaches thereto across the Rio Grande River at a point suitable to the interests of navigation within or near the city limits of El Paso, Texas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six, such construction to be made only with the consent and cooperation of the Republic of Mexico, and such bridge to be free of any toll.

Construction.
Vol. 34, p. 84.

Consent, etc., of Mexico required.

Commencement, etc.

SEC. 2. That this act shall be null and void unless the construction of said bridge is commenced within one year and completed within five years from the date of approval hereof.

Amendment.

SEC. 3. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, October 6, 1917.

August 4, 1917.
[H. Con. Res. No. 19.]

CONCURRENT RESOLUTION.

RIVER AND HARBOR APPROPRIATION BILL.

River and harbor appropriation bill.
Correction in enrollment of, directed.
Public Laws, p. 266.

Resolved by the House of Representatives (*the Senate concurring*), That in the enrollment of the bill (H. R. 4285) entitled "An Act making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes," the Clerk be, and he is hereby, authorized and directed to number the sections following section four of the bill in consecutive numerical order, any thing in the conference report to the contrary notwithstanding.

Passed, August 4, 1917.

FLOATING PLANT REPORT.

INDEX TO CONTENTS.

STATEMENT OF FLOATING PLANT OWNED BY THE UNITED STATES AND EMPLOYED IN THE ENGINEER DEPARTMENT AT LARGE FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1917.

[Compiled for the calendar year ending Dec. 31, 1917, and shown in tabular form.]

Table.	Page.	
1.	3947 to 3953, inc.	Alphabetical list, by names.
2.	3955 to 3975, inc.	Alphabetical list, by classes.
3.	3977 to 4111, inc.	Complete list of floating plant, by districts.
4.	4113 to 4162, inc.	Operations of seagoing hopper dredges.
5.	4163 to 4296, inc.	Operations of hydraulic pipe-line dredges.
6.	4297 to 4347, inc.	Operations of dipper dredges.
7.	4349 to 4379, inc.	Operations of bucket dredges.
8.	4381 to 4385, inc.	List of dry docks.
9.	4387 to 4392, inc.	List of boat-building plants.
10.	4393 to 4399, inc.	Hydraulic pipe-line dredging by contract.
11.	4401 to 4413, inc.	Dipper dredging by contract.
12.	4415 to 4428, inc.	Bucket dredging by contract.
13.	4429 to 4434, inc.	Drilling and blasting by contract.

TABLE 1.

ALPHABETICAL LIST OF FLOATING PLANT UPON WHICH REPORTS OF OPERATION ARE MADE, AND ALPHABETICAL LIST, BY NAMES, OF ALL FLOATING PLANT APPEARING IN TABLE 3.

TABLE 1.—*Alphabetical list of floating plant upon which reports of operations are made.*

Name, number, or letter.	Page.
Absecon	4114
Adams, Col. M. B	4298
Addison	4298
Ajax (Chattanooga)	4350
Ajax (Rock Island, Ill.)	4298
Alabama	4350
Albany	4350
Apo	4164
Appleton	4298
Atlantic	4118
Attalla	4303
Augusta	4164
B–1	4375
B–3	4375
B–6	4375
Bacon, Henry	4164
Barnard	4164
Benyaurd	4122
Beta	4171
Blackwater	4171
Burton	4122
Cape Fear	4122
Carrollton	4303
Cascade	4360
Casey	4360
Cataract	4171
Caucus	4127
Celilo	4171
Champoeg	4303
Charleston	4127
Cheraw	4303
Chinook	4127
Cincinnati	4308
Clamshell Derrick Barge (Montgomery, Ala.)	4370
Clatsop	4132
Clinton, De Witt	4178
Comstock	4132
Congaree	4184
Creighton	4178
Croatan	4184
Cumberland	4132
Currituck	4184
Dalecarlia	4190
Davenport	4308
Delatour	4190
Delaware	4137
Delta	4190
Epsilon	4190
Etna	4196
Flad, Henry	4196
Florida	4196
Fort Chartres	4196
Fort Gage	4203
Frankfort	4308
Gaillard, Col. D. D	4308
Galveston	4137
Gamma	4203
Geyser	4209
Gillespie, Gen. G. L	4203
Green River	4313
Grossetete	4360
Guadalupe	4209
Gulfport	4209
Hampton	4216
Harrod	4216
Hecla	4216
Hercules	4360
Houston, Sam	4216
Humphreys, Chas	4222
Illinois	4313
Indiana	4222
Iota	4222
Kappa	4222
Kentucky	4313
Keokuk	4313
Kewaunee	4318
Key West	4137
Kwasind	4318
Louisville	4318
McGregor, Robert	4228
Macon	4228
Mallery, Maj. J. C	4228
Malta	4355
Manhattan	4142
Manito	4355
Marietta	4318
Mason	4355
Maumee	4323
Mayon	4234
Meade, Gen. G. G	4142
Michie, Col. P. S	4142
Miller, Col. A. M	4234
Minquas	4148
Monticello	4234
Morgan	4234
Multnomah	4241
Muscogee	4241
Navesink	4148
New Orleans	4148
Nolichucky	4323
Nolin River	4323
Ohio	4323
Omro	4365
Orange	4241
Oregon	4247
Oshkosh	4365
Oswego	4328
Pascagoula	4247
Pelee	4247
Pettus	4254
Phoenix	4328
Portland	4254
Raritan	4153
Ravenswood	4328
Rosecrans	4365
Sabine	4153
Sacramento	4254
San Bernard	4254
San Jacinto	4261
San Joaquin	4261
San Pablo	4153
San Pedro	4261
Sarasota	4267
Savannah	4158
Scuppernong	4365
Selma	4267
Sevier	4328
Shippingport	4267
Sodus	4333
St. Paul	4333
Sumter	4158
Taal	4267
Taber, H. S	4273
Talcott	4273
Tellico	4333
Tennessee	4333
Thebes	4273
The Ram	4280
Tishomingo	4370
Tuscumbia	4338
Upatoi	4338
Vesuvius	4280
Vulcan	4338
Wahalak	4280
Wahkiakum	4280
Warroad	4287
Watauga	4338
Waterway	4287
Winyah Bay	4758
Zeta	4287
No. 1 (Kansas City, Mo.)	4370
No. 1 (Pittsburgh, Pa.)	4343
No. 2	4343
No. 6	4292
No. 68	4343
No. 1407	4292

Alphabetical list by names of all floating plant appearing in Table 3.

BALTIMORE, MD.:
- Pathfinder.
- Sentinel.

BOSTON, MASS.:
- Executive.
- Harwood, Col.
- Plebe.

BUFFALO, N. Y.:
- Black Rock.
- Casey, Thomas Lincoln.
- Gwendolen.
- Ontario.
- Scajaquada.
- Sodus.

CHARLESTON, S. C.:
- Cheraw.
- Congaree.
- Dawho.
- Granby.
- Louise.
- Pedee.
- Richland.
- Sumter.
- Tee-Ree.
- Wateree.
- Winyah Bay.

CHATTANOOGA, TENN.:
- Alabama.
- Chickamauga.
- Chilhowee.
- Clinch.
- Colbert.
- Kentucky.
- King, Col. W. R.
- Kwasind.
- Lookout.
- McPherson.
- Nolichucky.
- Ocoee.
- Tellico.
- Tennessee.
- Toco.
- Tuscumbia.
- Watauga.

CHICAGO, ILL.:
- Chicago.
- Comanche.
- Dearborn.
- Fox.
- Illinois.
- La Salle.
- Margaret.
- Pearl.
- Sea Gull.
- Seminole.

CINCINNATI, OHIO (first district).
- Cayuga.
- Chico.
- Cincinnati.
- Clermont.
- Comet.
- Guyandot.
- Indiana.
- Iroquois.
- Marietta.
- Miami.
- Mignon.
- Mingo.
- Nell.
- Ohio.
- Oswego.
- Ottawa.
- Scioto.
- Sisters, The.
- Woodruff, E. A.

CINCINNATI, OHIO (second district):
- Carrollton.
- Frankfort.
- Gregory.
- Kentucky.
- Malta.
- Merrill.
- Pearl.
- Pioneer.
- Vega.

CLEVELAND, OHIO:
- Ariel.
- Burton.
- Burton No. 22.
- Inspector.
- Maumee.
- Quest.
- Spear.

DALLAS, TEX.:
- Beaumont.
- Caddo.
- Culberson, C. A.
- Denison.
- Ino.
- Jefferson.
- Juanita.
- Liberty.
- Neches.
- Orange.
- Sabine.
- Texas.
- Trinity.

DETROIT, MICH.:
- Bug.
- Custodian.
- Don.
- Hay Lake.
- Iris.
- Lydecker, Gen. G. J.
- Lydecker, Gen. G. J. No. 1.
- Lydecker, Gen. G. J. No. 2.
- Noble, Alfred.
- Sapper.
- West Neebish.

DETROIT, MICH. (Lake Survey):
- Inspector.
- Lusk, Col. J. L.
- Netnokwa.
- Search.
- Surveyor.

DULUTH, MINN.:
- Circle.
- Curve.
- Essayons.
- Gaillard, Col. D. D.
- Nemadji
- Oskar.
- Sears, Gen. C. B.

GALVESTON, TEX.:
- Bastrop.
- Cavallo.
- Colonel.
- Commodore.
- Comstock.
- Copano.
- Galveston.
- Guadalupe.
- Hartrick, E. M.
- Helen.
- Hidalgo.
- Hill.
- Houston, Sam.
- Lavaca.
- Leslie.
- Mezquite.
- Miller, Col. A. M.
- Mustang.
- Padre.
- Palacios.
- San Bernard.
- San Jacinto.
- San Luis.
- Talfor, Capt.
- Victoria.
- Waco.

GRAND RAPIDS, MICH.:
- Engineer.
- Gillmore, Gen.
- Hancock.
- Hancock No. 2.
- Ludington.
- Meade, Gen. G. G.
- Saginaw.

HONOLULU, HAWAII:
- Mae Muat.
- Nola.
- Wild.

JACKSONVILLE, FLA.:
- Alafia.
- Barnard.
- Chica.
- Corvi.
- D'Armit.
- De Soto.
- Florida.
- Freak.
- Key West.
- Kissimmee.
- Maguire, Capt.
- Mallery, Maj. J. C.
- Meyler, Capt. J. J.
- Nassau.
- Sarasota.
- Sirius.
- Tocoi.
- Violetta.

KANSAS CITY, MO.:
- Augustin, Lieut.
- Augustin No. 1.
- Augustin No. 2.
- Baldwin, Edwin M.
- Bon Homme.
- Bonne Femme.
- Bonneville.
- Boone, Daniel.
- Charette.
- Chariton.
- Enquirer.
- Flirt.
- Gasconade.
- Gasconade.
- Gurney, Lieut.
- Gurney No. 1.
- Gurney No. 2.
- Hurricane.
- Katherine.
- Katherine No. 1.
- Katherine No. 2.
- Katherine No. 3.
- Keith, George G.
- Lewis, Lieut.
- Lewis No. 1.
- Lewis No. 2.
- McGregor, Robert.
- McPherson, James B.
- McPherson No. 2.
- McPherson No. 3.
- Mandan.
- Missouri.
- Missouri.
- Moniteau.
- Moreau.
- Niangua.
- Osage.
- Racket.
- Sioux.
- Taber, H. S.
- Tamerlane.
- Terrapin.
- Tomahawk.
- Wakenda.
- Wild Horse.

LITTLE ROCK, ARK.:
- Allen, A. D.
- Arkansas.
- Dredge No. 68.
- Inspector No. 1.
- Johnson, A. B.
- Quapaw.
- Reese, C. B.
- Riverside.
- Tallhana.
- Toltec.

LOS ANGELES, CAL.:
- Cerritos.
- San Pedro.

LOUISVILLE, KY.:
- Casey.
- Cherokee.
- Du Brie.

Alphabetical list by names of all floating plant appearing in Table 3—Continued.

LOUISVILLE, KY.—Contd.
- Echo River.
- Emerald.
- Green River.
- Laura.
- Louisville.
- Mammoth Cave.
- Nolin River.
- Portland.
- Shawnee.
- Shippingport.
- Tarascon.
- Wave Rock.

MANILA, P. I.:
- Engineer.
- Sand Dredge No. 6.

MEMPHIS, TENN. (M. R. C., first and second districts):
- Amelia.
- Chisca.
- Graham.
- Itasca.
- Minnetonka.
- Nolty, Augustus J.
- Opelika.
- Rees, W. M.
- Search.
- Search No. 1.
- Search No. 2.
- Wynoka.

MILWAUKEE, WIS.:
- Appleton.
- Ariadne.
- Berlin.
- Eureka.
- Fox.
- Heron.
- Industry.
- Kaukauna.
- Kaukauna.
- Kewaunee.
- Kingfisher.
- Mallard.
- Manitowoc.
- Montello.
- Omro.
- Oshkosh.
- Riprap.
- Wolf.

MOBILE, ALA.:
- Biloxi.
- Charleston.
- Chickasaw.
- Dauphin.
- Demopolis.
- Escatawpa.
- Gulfport.
- Harding, Horace.
- Humphreys, Chas.
- Jordan.
- Leaf.
- McCalla, R. C.
- Mamie K.
- Mulberry.
- Nugent.
- Number 6.
- Pascagoula.
- Pearl.
- Rettig.
- Sylph.
- Tallahatta.
- Tombigbee.
- Tuscaloosa.
- Ulkanush.
- Vienna.
- Wahalak.

MONTGOMERY, ALA.:
- Alabama.
- Arrow.
- Attalla.
- Blackwater.
- Carp.
- Catoma.
- Caucus.
- Chattahoochee.
- Chipola.
- Choctawhatchee.

MONTGOMERY, ALA.—Con.
- Columbus.
- Conecuh.
- Coosa.
- Coot.
- Escambia.
- Etowah.
- Eufaula.
- Flint.
- Leota.
- Muscogee.
- Oostenaula.
- Pettus.
- Primary.
- Santa Rosa.
- Shearwater.
- Sub Rosa.
- Thronateeska.
- Twining, Wm. J.
- Upatoi.
- Vernon.

NASHVILLE, TENN.:
- Eudora.
- Harpeth.
- Henry.
- Hiwassee.
- John.
- Mansker.
- Sevier.
- Tishomingo.
- Warioto.
- White Oak.

NEW LONDON, CONN.:
- Ellis.
- Katharine.
- Pequot.

NEW ORLEANS, LA.:
- Amite.
- Balize.
- Benyaurd.
- Boeuf.
- Calcasieu.
- Chene.
- Choupique.
- Delatour.
- Donovan, C.
- Grossetete.
- Hyacinth.
- Intracoastal.
- Lacassine.
- Maurepas.
- New Orleans.
- Pickett.
- Pigeon.
- Reese, Gen.
- Salvador.
- Stadia.
- Tonty.
- Uacha.
- Vermilion.

NEW ORLEANS, LA. (fourth Mississippi River district):
- Baton Rouge.
- Bayou Goula.
- Bayou Sara.
- Beatrice.
- Chalmette.
- Donaldsonville
- Lafourche.
- Lake Borgne.
- Manchac.
- Marengo.
- Morganza.
- Natchez.
- Neptune.
- New Orleans.
- Newton, Gen. John.
- Olga.
- Plaquemine.
- Port Hudson.
- Ram.
- St. Joseph.
- Teche.
- Tensas.
- Tickfaw.
- Torras.
- Tunica.
- Vidalia.

NEWPORT, R. I.:
- Engineers, U. S.
- Gazelle.
- Menomoy.

NEW YORK (first district):
- Derby, Capt. Geo. H.
- De Witt, Clinton.
- Gillespie, Gen. G. L.
- Marie.
- Sweep.
- Wah-ta-wah.

NEW YORK (second district):
- Atlantic.
- Drift.
- Ingalls, Gen.
- Manisees.
- Navesink.
- Raritan.
- Rockaway.
- Schuyler.

NEW YORK, N. Y. (supervisor of New York Harbor):
- Cerberus.
- Lamont.
- Lookout.
- Nimrod.
- Scout.
- Vigilant.

NORFOLK, VA.:
- Chipeta.
- Coinjock.
- Currituck.
- Hampton.
- Long Point.
- Millville.
- Monden.
- Norva.
- Okisko.
- Paquippe.
- Powhatan.
- Pungo.
- Roanoke.
- Skycoat.
- Starvation.

PHILADELPHIA, PA.:
- Camden.
- Cataract.
- Chester.
- Delaware.
- Delaware.
- Manhattan.
- Mifflin.
- New Castle.
- Observer.
- Philadelphia.
- Rattler.
- Trenton.
- Vidette.

PITTSBURGH, PA.:
- Albatross.
- Deluge.
- It, M. R.
- Kittanning.
- Luzon.
- Monongahela.
- Roberts, T. P.
- Slackwater.
- Swan.

PORTLAND, ME.:
- Norka.

PORTLAND, OREG. (first district):
- Asotin.
- Cascade.
- Celilo.
- Coyote.
- Jennie.
- Michie, Col. P. S.
- Murrelet.
- Nehalem.
- Ocia.
- Oregon.
- Palouse.
- Tumwater.
- Umatilla.

Alphabetical list by names of all floating plant appearing in Table 3—**Continued.**

- PORTLAND, OREG. (second district):
  - Adams, H. M.
  - Arago.
  - Champoeg.
  - Chinook.
  - Clatsop.
  - Eureka.
  - Mathloma.
  - Mendell, G. H.
  - Monticello.
  - Multnomah.
  - Papoose.
  - Post, J. C.
  - Salem.
  - Vigilant.
  - Wahkiakum.
  - Woodland.
- ROCK ISLAND, ILL.:
  - Ada.
  - Ajax.
  - Alberita.
  - Alert.
  - Alma.
  - Apache.
  - Apo.
  - Bass.
  - Beetle.
  - Bittern.
  - Chippewa.
  - Coal Bluff.
  - Cobra.
  - Comet.
  - Coot.
  - Cordova.
  - Crane.
  - Curlew.
  - Dahlia.
  - Daisy.
  - Dakota.
  - Davenport.
  - Davy.
  - Elinor.
  - Ellen.
  - Elsie.
  - Emily.
  - Etna.
  - Firefly.
  - Folly.
  - Fury.
  - Galena.
  - Gar.
  - Geyser.
  - Gnat.
  - Grace.
  - Grey Cloud.
  - Gull.
  - Hamilton.
  - Hecla.
  - Hiawatha.
  - Holly.
  - Hornet.
  - Jolly.
  - Keokuk.
  - Lark.
  - Le Claire.
  - Leona.
  - Locust.
  - Long, J. C.
  - Loon.
  - Louise.
  - Lucia.
  - Mac.
  - Marion.
  - Mayon.
  - Minneapolis.
  - Minnehaha.
  - Minneiska.
  - Molly.
  - Mosquito.
  - Moth.
  - Muscatine.
  - Myra.
  - Nauvoo.
  - Otter.
- ROCK ISLAND, ILL.—Cont'd.
  - Pansy.
  - Pelee.
  - Peony.
  - Pepin.
  - Perch.
  - Pink.
  - Plover.
  - Quincy.
  - Rambler.
  - Rock Island Rapids.
  - Rose.
  - Ruth.
  - Sangamon.
  - Scorpion.
  - Shad.
  - Snipe.
  - Sny.
  - St. Paul.
  - Swallow No. 2.
  - Taal.
  - Tipton, David.
  - Trimbelle.
  - Trout.
  - Vamos.
  - Vesuvius.
  - Viola.
  - Violet.
  - Viper.
  - Wacouta.
  - Wasp.
  - Waumandee.
  - Zumbro.
- SAN FRANCISCO, CAL. (first district):
  - Clyde.
  - Dora.
  - San Pablo.
  - Suisun.
  - Suisun No. 1.
  - Suisun No. 2.
  - Suisun No. 3.
- SAN FRANCISCO, CAL. (third district):
  - Clyde.
  - Kern.
  - Rio Vista.
  - Tackle.
  - Sacramento.
  - San Joaquin.
  - Seizer.
- SAVANNAH, GA.:
  - Amelia.
  - Angler.
  - Augusta.
  - Brunswick.
  - Caucus.
  - Cockspur.
  - Cosine.
  - Creighton.
  - Cumberland.
  - Gem.
  - Gibbon.
  - Macon.
  - Material T. B.
  - Morgan.
  - Oconee.
  - Pulaski.
  - Savannah.
  - Sapelo.
  - Seneca.
  - Snagboat.
  - Spray.
  - Tugaloo.
  - Uchee.
- SEATTLE, WASH.:
  - Columbia River No. 1.
  - Columbia River No. 2.
  - Columbia River No. 3.
  - Kettle Falls.
  - Orcas.
  - Swinomish.
  - Wilson.
- ST. LOUIS, MO.:
  - Aux Vases.
  - Birch.
- ST. LOUIS, MO.—Continued.
  - Fort Chartres.
  - Fort Gage.
  - Isle de Bois.
  - Kaskaskia.
  - King, Wm. R.
  - Macomb, J. N.
  - Meramec.
  - Phoenix.
  - Salvisi.
  - Selma.
  - Simpson, Gen. J. H.
  - Stewart.
  - Thebes.
  - Vulcan.
  - Wright, H. G.
- ST. LOUIS, MO. (Mississippi River Commission):
  - Beta.
  - Bolivar.
  - Choctaw.
  - Delta.
  - Epsilon.
  - Ewens, John.
  - Flad, Henry.
  - Gamma.
  - Harrod, B. M.
  - Hydrog.
  - Inspector, M. R. C.
  - Iota.
  - Jupiter.
  - Kappa.
  - Leota.
  - Mars.
  - Mercury.
  - Mississippi.
  - Nokomis.
  - Obion.
  - Sachem.
  - Saturn.
  - Venus.
  - Vulcan.
  - Wabash No. 3.
  - Zeta.
- ST. PAUL, MINN.:
  - Amik.
  - Animiki.
  - Bequoq.
  - Bull Calf.
  - Manito.
  - Nawapon.
  - Niggik.
  - Nodin.
  - Oriole.
  - Tigo.
  - Wampum.
  - Warroad.
  - Wigwam.
- VICKSBURG, MISS.:
  - Florence, Thos. B.
  - Franklin.
  - Howell, C. W.
  - Humphreys, Ben.
  - L'Eau Noir.
  - Ouachita.
  - Ransdell, Jos. E.
  - Roland.
  - Waterway.
- VICKSBURG, MISS. (third Mississippi River):
  - Boaz.
  - Carroll.
  - Chicot.
  - Control.
  - Coppee, H. St. L.
  - Hider, Arthur.
  - Issaquena.
  - Sydney C.
  - White Water.
- WASHINGTON, D. C.:
  - Ana.
  - Atlas.
  - Averill.
  - Bell.
  - Castle.

Alphabetical list, by names, of all floating plant appearing in Table 3—Continued.

WASHINGTON, D. C.—Contd.
- Dalecarlia.
- Engineer.
- Leach, Col.
- Pontonier.
- Relee.
- Talcott.
- York.

WHEELING, W. VA.:
- Adams, Col. M. B.
- Addison.
- Alto.
- Benwood.
- Craighill, Gen.
- Croset.
- Glenville.
- Mason.
- Monroe.
- Nanina.
- Ravenswood.

WHEELING, W. VA.—Contd.
- Rosecrans.
- Rumsey, James.
- Tiskelwah.
- Turtle, Capt.

WILMINGTON, DEL.:
- Absecon.
- Absecon.
- Gannet.
- Hinda.
- Minquas.
- Minquas.
- Uncle Sam.

WILMINGTON, N. C.:
- Ajax.
- Bacon, Henry.
- Beaufort.
- Black.
- Cape Fear.
- Caswell, Richard.

WILMINGTON, N. C.—Contd.
- Contentnea.
- Coquet.
- Croatan.
- Cynthia.
- Faber.
- Frances.
- Hercules.
- Krey, John.
- Lilliput.
- Manteo.
- Mercur.
- Nancy.
- Neuse.
- Oliva.
- Polly.
- Rocks.
- Scuppernong.
- Spry.
- Wright, Gen. H. G.

TABLE 2.

ALPHABETICAL LIST, BY CLASSES, OF FLOATING PLANT OWNED BY ENGINEER DEPARTMENT.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department.*

[NOTE.—For complete lists of floating plant, by districts, see Table III.]

SEAGOING HOPPER DREDGES.

(For operations of these dredges, see Table 4, pp. 4113 to 4162, inclusive.)

Name, number, or letter.	Displacement.	Dimensions.						Material.	Complement.		District.
		Length.		Breadth.		Depth.			Officers.	Men.	
	Tons.	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*				
Absecon	994	150	0	36	6	12	0	Steel	4	16	Wilmington, Del.
Atlantic	2,670	288	0	47	6	25	0	...do	9	61	New York (2d).
Benyaurd	2,978	271	6	47	6	23	0	...do	10	53	New Orleans.
Burton	1,510	177	0	38	0	19	0	...do	5	23	Cleveland.
Cape Fear	480	131	3	29	0	12	0	Wood	4	26	Wilmington, N. C.
Caucus	1,980	200	0	41	0	23	2	...do	7	28	Montgomery, Ala.
Charleston	800	122	6	30	0	19	8	...do	6	21	Mobile, Ala.
Chinook	7,400	460	0	49	0	34	0	Steel	14	57	Portland, Oreg. (2d).
Clatsop	1,360	180	0	38	0	23	0	...do	7	33	Do.
Comstock	1,100	155	0	35	0	17	0	...do	......	32	Galveston.
Cumberland	1,905	200	0	41	0	23	6	...do	6	30	Savannah.
Delaware	4,200	315	0	53	0	22	6	...do	9	51	Philadelphia.
Galveston	3,375	304	0	51	0	27	0	...do	6	26	Galveston.
Key West	1,000	142	0	31	7	15	0	Wood	4	22	Jacksonville.
Manhattan	4,000	288	0	47	6	25	0	Steel	9	51	Philadelphia.
Meade, Gen. G. G	1,458	177	0	38	0	19	0	...do	6	30	Grand Rapids.
Michie, Col. P. S	1,526	242	0	43	0	20	0	...do	6	23	Portland, Oreg. (1st).
Minquas	1,105	147	0	30	0	12	0	...do	5	20	Wilmington, Del.
Navesink	3,150	290	0	47	6	28	0	...do	9	54	New York (2d).
New Orleans	4,425	315	0	50	0	26	0	...do	14	59	New Orleans.
Raritan	2,930	290	0	47	6	28	0	...do	9	62	New York (2d).
Sabine	700	145	0	35	0	12	0	Wood	5	12	Dallas.
San Pablo	1,100	163	6	35	0	17	0	Steel	7	36	San Francisco (1st).
Savannah	1,461	177	0	38	0	19	0	...do	6	28	Savannah.
Sumter	1,706	200	0	41	0	22	0	Wood	6	34	Charleston.
Winyah Bay	831	141	0	31	6	13	6	...do	4	20	Do.

HYDRAULIC PIPE-LINE DREDGES.

(For operations of these dredges, see Table 5, pp. 4163 to 4296, inclusive.)

Name, number, or letter.	Displacement.	Dimensions.						Material.	Complement.		District.
		Length.		Breadth.		Depth.			Officers.	Men.	
	Tons.	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*				
Apo	294	132	0	25	5	5	0	Composite.	5	13	Rock Island.
Augusta	140	74	0	28	0	4	6	Steel	2	17	Savannah.
Bacon, Henry	1,410	150	6	39	0	15	0	Wood	2	46	Wilmington, N. C.
Barnard	1,291	206	2	38	0	14	0	Steel	......	......	Jacksonville.
Beta	1,300	214	0	58	0	6	11	...do	3	53	St. Louis (M. R. C.).
Blackwater	465	110	0	32	0	9	4	Wood	4	24	Montgomery.
Cataract	886	140	6	40	4	10	7	...do	4	20	Philadelphia.
Celilo	64	76	0	22	0	4	4	...do	1	5	Portland, Oreg. (1st).
Clinton, De Witt	383	95	0	27	6	8	6	...do	8	32	New York (1st).
Congaree	430	104	0	32	0	6	0	...do	2	11	Charleston, S. C.
Creighton	221	80	0	30	0	6	0	Steel	3	12	Savannah.
Croatan	235	80	1	23	6	8	0	Wood	5	5	Wilmington, N. C.
Currituck	805	150	0	37	0	11	10	Steel	9	39	Norfolk.
Dalecarlia	233	80	0	26	0	7	0	...do	1	13	Washington, D. C.
Delatour	390	112	0	30	0	5	0	Wood	......	......	New Orleans.
Delta	830	185	6	38	0	8	4	Steel	3	37	St. Louis (M. R. C.).
Epsilon	650	162	0	40	0	7	6	...do	3	37	Do.
Etna	280	130	0	28	0	5	0	Composite.	5	13	Rock Island.
Flad, Henry	834	192	0	44	0	7	0	Steel	3	40	St. Louis (M. R. C.).
Florida [1]	371	152	0	29	9	7	0	...do	4	17	Jacksonville.
Fort Chartres	815	197	0	45	0	7	6	...do	14	42	St. Louis.
Fort Gage	815	197	0	45	0	7	6	...do	14	42	Do.
Gamma	581	165	6	38	0	7	10	...do	3	33	St. Louis (M. R. C.).
Geyser	141	100	0	24	0	4	5	Composite	5	14	Rock Island.
Gillespie, Gen. G. L	880	150	0	37	0	11	10	Steel	7	36	New York (1st).
Guadalupe	400	188	0	28	0	5	9	Wood	8	12	Galveston.
Gulfport	886	150	0	40	0	11	6	Steel	11	31	Mobile.

[1] Combination hydraulic and bucket dredge.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

HYDRAULIC PIPE-LINE DREDGES—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
Hampton	91	60 0	23 0	6 0	Wood	2	5	Norfolk.
Harrod, B. M	1,270	210 0	44 0	8 6	Iron and steel.	3	44	St. Louis (M. R. C
Hecla	217	120 0	26 0	5 0	Wood	5	14	Rock Island.
Houston, Sam	981	148 0	38 0	12 0	...do	13	44	Galveston.
Humphreys, Chas	234	129 9	32 0	8 9	...do	5	20	Mobile.
Indiana	417	125 0	34 0	6 10	Steel	1	27	Cincinnati (1st).
Iota	800	192 0	44 0	7 0	...do	3	44	St. Louis (M. R. C.
Kappa	834	192 0	44 0	7 0	...do	3	40	Do.
Macon	120	74 0	28 0	4 6	...do	2	9	Savannah.
Mallery, Maj. J. C	666	130 0	32 0	9 0	...do	8	31	Jacksonville.
Mayon	309	130 5	28 0	5 5	...do	5	13	Rock Island.
McGregor, Robert	700	206 9	44 4	7 0	...do	7	45	Kansas City.
Miller, Col. A. M	710	138 6	37 0	13 0	Wood	5	55	Galveston.
Monticello	195	103 3	34 6	5 10	...do	2	9	Portland, Oreg. (2d
Morgan	667	134 5	38 0	8 0	Steel	6	38	Savannah.
Multnomah	1,135	269 4	39 0	9 6	...do	7	41	Portland, Oreg. (2d.
Muscogee	309	120 0	30 0	7 6	Wood	2	6	Montgomery.
No. 6	91	90 0	24 0	5 0	Composite	......	......	Mobile.
Orange	547	115 0	36 0	9 6	Wood	2	20	Dallas.
Oregon	645	120 0	36 0	11 0	...do	3	29	Portland, Oreg. (1st
Pascagoula	771	150 0	40 0	10 6	Steel	11	30	Mobile.
Pelee	250	119 0	30 0	5 0	Wood	4	14	Rock Island.
Pettus	488	135 0	35 0	6 6	...do	3	23	Montgomery.
Portland	131	100 0	22 0	5 0	Steel	......	......	Louisville.
Ram	419	125 0	30 0	7 0	...do	6	20	New Orleans (M. R. C. 4th).
Sacramento	984	150 0	40 0	11 6	...do	11	31	San Francisco (3d)
San Bernard	440	83 0	32 0	7 6	Wood	8	32	Galveston.
San Jacinto	981	148 0	38 0	12 0	...do	7	44	Do.
San Joaquin	984	140 0	40 0	11 6	Steel	11	31	San Francisco (3d).
San Pedro	834	140 8	40 8	10 7	...do	7	27	Los Angeles.
Sarasota	150	77 0	29 6	5 0	...do	2	8	Jacksonville.
Selma	600	160 0	40 0	6 0	...do	14	39	St. Louis.
Shippingport	131	100 0	22 8	5 0	...do	......	......	Louisville.
Taal	299	130 0	28 0	5 0	Composite	5	13	Rock Island.
Taber, H. S	754	206 9	44 4	7 0	Steel	7	45	Kansas City.
Talcot, Capt. Andrew	465	111 8	32 0	9 7	Wood	......	19	Washington, D. C.
Thebes	600	160 0	40 0	6 0	Steel	14	39	St. Louis.
Uncle Sam	450	85 0	34 0	7 0	Wood	......	......	Wilmington, N. C.
Vesuvius	244	114 10	30 0	5 0	...do	4	14	Rock Island.
Wahalak	886	150 0	40 0	11 6	Steel	11	31	Mobile.
Wahkiakum	1,135	269 4	39 0	9 6	...do	7	41	Portland, Oreg. (3d).
Warroad	260	118 6	27 0	8 6	Wood	2	7	St. Paul.
Waterway	417	163 0	34 0	7 0	Steel	5	25	Vicksburg.
Zeta	650	162 0	40 0	7 6	...do	3	40	St. Louis (M. R. C.).
No. 1407	165	120 0	30 0	7 0	Wood	......	6	Memphis, Tenn. (M. R. C.).

DIPPER DREDGES.

(For operation of these dredges see Table 6, pp. 4297 to 4347, inclusive.)

Adams, Col. M. B	417	112 0	34 0	7 3	Steel	1	7	Wheeling.
Addison	177	75 0	30 0	7 2	Wood	......	6	Do.
Ajax	124	73 0	26 0	6 0	...do	1	6	Rock Island.
Appleton	214	90 0	32 0	7 0	...do	1	5	Milwaukee.
Attalla	206	75 0	26 4	5 6	...do	2	6	Montgomery.
Carrollton	250	86 0	30 0	6 9	Steel	......	9	Cincinnati (2d).
Champoeg	165	80 0	30 0	5 0	Wood	1	9	Portland, Oreg. (2d).
Cheraw	620	155 0	28 0	7 1	Steel	2	12	Charleston, S. C.
Cincinnati	297	115 6	34 0	6 10	Steel and iron.	1	10	Cincinnati (1st).
Davenport	348	110 0	40 0	6 0	Steel	......	6	Rock Island.
Frankfort	115	72 0	28 0	5 5	Wood	......	9	Cincinnati (1st).
Gaillard, Col. D. D	780	116 0	40 0	11 6	Steel	1	10	Duluth.
Green River	268	112 0	31 0	4 0	Wood	......	15	Louisville.
Illinois	280	90 0	34 0	8 0	...do	1	4	Chicago.
Kentucky	326	100 0	34 0	6 10	...do	......	10	Chattanooga.
Keokuk	348	110 0	40 0	6 0	Steel	......	6	Rock Island.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

DIPPER DREDGES—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
Kewaunee	443	100 0	34 0	9 0	Composite	1	16	Milwaukee.
Kwasind	187	80 0	28 0	6 6	Wood		8	Chattanooga.
Louisville	128	67 0	28 6	6 0	Iron	1	8	Louisville.
Marietta	297	115 6	34 0	6 10	Steel and iron.	1	10	Cincinnati (1st).
Maumee	549	100 0	36 0	11 0	Wood	2	11	Cleveland.
Nolichucky	252	85 0	30 0	6 10	...do			Chattanooga.
Nolin River	210	88 8	30 8	6 6	Steel	1	7	Louisville.
Ohio	270	112 0	31 6	6 8	Iron	1	10	Cincinnati (1st).
Oswego	235	94 0	31 6	6 1	...do	1	10	Do.
Phoenix	309	80 0	30 0	8 0	Wood	1	5	St. Louis.
Ravenswood	238	80 0	30 6	6 6	...do		7	Wheeling.
Sodus	375	100 0	35 0	9 2	...do	2	8	Buffalo.
Sevier	200	80 0	30 0	7 0	...do			Nashville.
St. Paul	348	110 0	40 0	6 0	Steel		6	Rock Island.
Tellico	190	75 0	26 0	7 0	Composite		10	Chattanooga.
Tennessee	375	100 0	34 0	6 10	...do		10	Do.
Tuscumbia	375	100 0	34 0	6 10	...do		10	Do.
Upatoi	212	85 0	30 0	6 0	Wood	2	8	Montgomery.
Vulcan	240	80 0	30 0	8 0	...do	1	5	St. Louis.
Watauga	400	100 0	34 0	7 10	...do		10	Chattanooga.
No. 1	303	85 0	32 0	7 0	...do	2	7	Pittsburgh.
No. 2	197	86 6	30 0	4 8	...do	2	7	Do.
No. 68	220	104 7	30 6	5 4	...do	1	7	Little Rock.

BUCKET DREDGES.

(For operation of these dredges see Table 7, pp. 4349 to 4379, inclusive.)

Ajax	400	82 0	32 8	10 4	Wood	2	9	Wilmington, N. C.
Alabama	244	80 0	38 0	6 0	...do		7	Chattanooga.
Albany	75	70 0	30 0	4 9	...do	1	6	Montgomery.
B-1	302	102 0	40 0	7 3	...do			New Orleans (M. R. C. 4th).
B-2	341	110 0	42 0	7 6	Steel	4	8	Do.
B-3	442	110 0	42 0	7 6	...do			Do.
B-6	442	110 0	42 0	7 6	...do	4	8	Do.
Cascade	90	70 0	30 0	4 0	Wood	1	7	Portland, Oreg. (1st).
Casey	163	86 0	28 0	6 5	...do	1	7	Louisville, Ky.
Clamshell derrick barge.	30	80 0	22 0	4 2	...do			Montgomery.
Grossetete	258	80 4	34 3	5 0	...do	3	9	New Orleans.
Hercules	670	100 0	38 0	11 4	...do	1	11	Wilmington, N. C.
Malta	160	70 0	31 4	6 10	...do		9	Cincinnati (2d).
Manito	307	106 0	44 0	7 0	...do			St. Paul.
Mason	800	100 0	27 0	5 6	...do			Wheeling.
Monticello	195	103 3	34 6	5 10	...do	2	9	Portland, Oreg. (2d).
Omro	150	100 0	30 0	6 0	...do	1	4	Milwaukee.
Oshkosh [1]	234	75 0	31 0	6 0	...do	1	9	Do.
Rosecrans	176	111 0	22 0	5 0	...do	1	5	Wheeling.
Scuppernong	186	78 0	32 0	7 0	...do	2	8	Wilmington, N. C.
Tishomingo	481	107 0	44 0	5 5	...do		10	Nashville.
No. 1	120	92 0	30 0	4 4	...do	2	6	Kansas City, Mo.

SNAG BOATS.

Arkansas	235	155 6	30 0	4 6	Steel	3	20	Little Rock.
Chattahoochee	233	140 0	29 0	4 0	Wood	3	22	Montgomery.
Choctawhatchee	115	90 0	24 0	3 6	...do	2	8	Do.
Conecuh	87	60 0	20 0	3 0	...do	1	8	Do.
Culberson, C. A	200	106 0	28 0	5 0	...do	4	12	Dallas.
Delatour [2]	350	112 0	30 0	5 0	...do	5	10	New Orleans.
Demopolis	96	82 2	25 7	4 0	...do	2	11	Mobile.
Denison	265	136 0	32 7	4 6	Steel	4	15	Dallas.
Escambia	112	92 0	25 0	4 0	Wood	2	8	Montgomery.
Escatawpa	62	60 0	20 0	4 0	...do	2	11	Mobile.

[1] Ladder dredge.

[2] Snag boat and bucket dredge.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

SNAG BOATS—Continued.

Name, number, or letter.	Displacement.	Dimensions.						Material.	Complement.		District.
		Length.		Breadth.		Depth.			Officers.	Men.	
	Tons.	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*				
Flint	127	95	0	24	0	4	0	Wood	3	9	Montgomery.
Florence, Thos. B	107	109	6	20	0	4	0	Iron and steel.	3	9	Vicksburg.
Geneva	42	64	0	22	6	4	4	Wood	2	8	Montgomery.
Howell, C. W	304	166	0	36	0	5	0	Iron and steel.	3	23	Vicksburg.
Humphreys, Ben	286	155	6	32	0	5	0	...do	3	23	Do.
Iroquois	177	148	2	28	6	4	0	Steel	4	15	Cincinnati (1st).
Johnson, A. B	58	84	0	22	0	3	0	Wood	1	11	Little Rock.
Kentucky	370	148	0	30	0	5	6	...do	4	12	Cincinnati (2d).
Kissimmee	65	60	0	18	0	4	0	...do	2	5	Jacksonville.
Macomb, J. N	1,160	177	6	62	0	8	0	Steel	6	36	St. Louis.
Mammoth Cave	284	141	0	32	8	5	0	...do	3	15	Louisville.
Mandan	150	156	0	24	0	4	7	...do	3	14	Kansas City.
Mathloma	177	160	0	34	6	5	6	Wood	3	11	Portland, Oreg. (2d).
McCalla, R. C	180	119	6	28	3	5	0	...do	4	20	Mobile.
McPherson, James B	340	194	10	36	0	5	7	Steel	5	18	Kansas City.
Missouri	510	187	0	52	0	7	0	...do	6	36	Do.
Oconee	126	110	0	38	0	4	4	Wood	3	11	Savannah.
Oriole	85	107	0	22	4	5	0	...do	......	......	St. Paul.
Pearl	128	96	6	26	0	5	0	...do	3	11	Mobile.
Pedee	317	131	8	26	0	5	3	Steel	2	12	Charleston.
Pigeon	65	60	0	30	6	6	0	Wood	......	......	New Orleans.
Quapaw	240	147	6	30	0	4	4	Steel	3	19	Little Rock.
Ransdell, Jos. E	286	155	6	32	0	5	0	Iron and steel.	3	23	Vicksburg.
Reese, C. B	340	195	9	36	0	5	3	...do	3	27	Little Rock.
Riverside	57	84	0	22	0	3	0	Wood	1	11	Do.
Roanoke	232	115	0	24	0	5	10	...do	3	5	Norfolk.
Seizer	240	136	6	34	11	4	8	...do	3	29	San Francisco (3d).
Swan	264	159	0	31	4	4	6	Steel	3	11	Pittsburgh.
Swinomish	276	138	0	32	0	5	6	Wood	......	......	Seattle.
Tipton, David	265	164	0	34	0	5	0	...do	7	19	Rock Island.
Tombigbee	180	119	0	28	0	5	4	...do	3	14	Mobile.
Trinity	190	123	5	30	0	3	0	...do	4	12	Dallas.
Tugaloo	336	129	3	34	0	5	6	Composite.	3	12	Savannah.
Twining, Wm. J	370	155	0	30	0	4	0	Wood	4	15	Montgomery.
Vienna	152	117	6	26	0	4	6	...do	3	12	Mobile.
Waco	200	118	8	30	2	5	0	...do	4	12	Dallas.
Wateree	317	131	8	26	0	5	3	Steel	2	12	Charleston.
Woodruff, E. A	863	226	0	48	0	7	6	Iron and steel.	5	25	Cincinnati (1st).
Wright, Gen. H. G	130	101	6	25	0	5	6	Wood	2	7	Wilmington, N. C.
Wright, H. G	1,100	187	0	62	0	8	0	Steel	6	36	St. Louis.
York	110	72	0	22	0	6	0	Wood	......	......	Washington, D. C.
No. 1	64	90	0	24	0	2	6	...do	1	15	Nashville.
No. 1	35	54	0	18	0	4	0	...do	2	4	Savannah.

DERRICK BOATS.

Asotin	200	140	0	28	0	5	0	Wood	......	......	Portland, Oreg. (1st).
Atlas	186	72	0	34	0	5	0	Steel	2	3	Washington, D. C.
Black	35	45	0	20	0	4	0	Wood	1	7	Wilmington, N. C.
C	29	46	0	32	0	3	6	...do	......	......	Mobile.
Captain Turtle	88	65	0	30	0	4	6	...do	......	......	Wheeling.
Contentnea	32	40	0	20	0	4	0	...do	1	6	Wilmington, N. C.
D. B. No. 4	140	70	0	26	1	2	8	...do	1	8	Galveston.
Mingo	116	94	0	32	0	5	0	Steel	......	5	Cincinnati (1st).
Monongahela	227	120	0	28	0	3	6	Wood	......	......	Pittsburgh.
Rattler	240	85	0	32	0	7	3	...do	2	11	Philadelphia.
Saginaw	92	83	9	32	0	6	7	...do	......	5	Grand Rapids.
Sapelo	160	82	4	29	8	5	5	...do	1	11	Savannah.
Tallahatta	81	50	0	40	0	5	0	...do	......	......	Mobile.
Umatilla	300	159	0	34	4	5	1	...do	3	14	Portland, Oreg. (1st).
No. 1	50	34	3	13	2	3	0	...do	......	......	Chicago.
No. 1	107	70	0	32	0	5	0	Steel	......	......	Cincinnati (1st).
No. 1	185	102	6	32	0	7	10	Wood	......	1	Cleveland.
No. 1	115	65	0	27	0	5	6	...do	3	10	Galveston.
No. 1	81	66	6	29	6	5	10	...do	......	2	Milwaukee.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

DERRICK BOATS—Continued.

Name, number, or letter.	Displacement.	Dimensions.						Material.	Complement.		District.
		Length.		Breadth.		Depth.			Officers.	Men.	
	Tons.	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*				
No. 1	142	100	0	30	0	4	9	Wood	1	1	New Orleans (M. R. C. 4th).
No. 1	78	63	0	24	0	5	0	...do			New Orleans.
No. 1	84	74	0	26	0	5	0	...do	2	3	Buffalo.
No. 1	51	65	0	28	5	3	10	...do			Portland, Oreg. (1st).
No. 1	42	51	0	22	6	2	10	...do			Portland, Oreg. (2d).
No. 1	75	68	0	20	0	3	1	...do			St. Louis.
No. 1	105	95	0	32	0	2	6	...do		20	Vicksburg.
No. 1, G. & B	76	70	0	26	0	4	0	...do		2	Louisville.
No. 1, M. R	86	70	0	26	0	3	8	...do			Pittsburgh.
No. 1, M. R. C	132	80	0	36	0	5	0	Steel			St. Louis (M. R. C.).
No. 1, O. R	87	71	0	30	7	4	0	Wood			Pittsburgh.
No. 1, O. R	131	70	0	32	0	5	0	Steel		3	Louisville.
No. 2	107	70	0	32	0	5	0	...do			Cincinnati (1st).
No. 2	102	65	0	26	0	5	0	Wood	3	9	Galveston.
No. 2	131	84	2	27	4	6	8	...do		2	Milwaukee.
No. 2	106	76	0	26	0	6	3	...do	2	3	Buffalo.
No. 2	128	100	0	30	0	4	9	...do			New Orléans (4th M. R. C.).
No. 2	84	70	0	30	0	4	0	...do	1	9	Portland, Oreg. (1st).
No. 2	42	51	0	22	6	2	10	...do			Portland, Oreg. (2d).
No. 2	75	68	0	20	0	3	1	...do			St. Louis.
No. 2	54	65	0	24	0	3	0	...do	2	18	Vicksburg.
No. 2, G. & B	76	70	0	26	0	4	0	...do		3	Louisville.
No. 2, M. R	80	70	6	26	6	4	0	...do			Pittsburgh.
No. 2, O. R	131	70	0	32	0	5	0	Steel		3	Louisville.
No. 2, U. S. E. D. Wheeling.	113	74	9	34	11	4	1	Wood		1	Wheeling.
No. 3	107	70	0	32	0	5	0	Steel			Cincinnati (1st).
No. 3	236	50	0	42	0	12	0	...do			Detroit.
No. 3	76	80	0	22	0	6	4	Wood		1	Do.
No. 3	128	100	0	30	0	1	9	...do			New Orleans (4th M. R. C.).
No. 3	100	75	6	30	0	5	9	...do		9	New Orleans.
No. 3	60	75	0	30	0	5	0	...do			Memphis (M. R. C. 1st, 2d).
No. 3	144	80	0	30	0	4	7	...do		2	Nashville.
No. 3	42	51	0	22	6	2	10	...do			Portland, Oreg. (2d).
No. 3, M. R	90	70	7	26	7	4	0	...do			Pittsburgh.
No. 3, U. S. E. D. Wheeling.	185	75	0	35	0	4	7	...do		1	Wheeling.
No. 4	64	80	0	32	7	3	2	...do			Chattanooga.
No. 4	117	80	0	30	0	4	6	...do		2	Do.
No. 4	107	70	0	32	0	5	0	Steel			Cincinnati (1st).
No. 4	107	70	0	32	0	5	0	...do		2	Cincinnati (2d).
No. 4	140	70	0	26	1	4	10	Wood			Galveston.
No. 4	82	67	5	30	0	4	0	...do			Little Rock.
No. 4	19	29	6	10	0	3	10	...do			Los Angeles.
No. 4	98	70	0	32	0	4	7	...do		2	Nashville.
No. 4	42	51	0	22	6	2	10	...do			Portland, Oreg. (2d).
No. 4, G. & B	120	80	8	26	8	5	0	Steel		2	Louisville.
No. 4. M. R	101	70	0	32	0	3	8	Wood			Pittsburgh.
4 B 3	4	40	0	7	4	2	1	...do			Wheeling.
No. 5	250	100	0	34	0	6	10	...do		3	Chattanooga.
No. 5	65	65	0	30	0	4	10	Steel		1	Cincinnati (2d).
No. 5	19	40	0	18	0	3	6	Wood			Los Angeles.
No. 5	98	70	0	32	0	4	7	...do			Nashville.
No. 5	166	75	6	28	6	7	0	...do			Manila.
No. 5	112	90	0	30	0	6	4	...do		5	Portland, Oreg. (2d).
No. 5, M. R	89	70	0	32	0	3	8	...do			Pittsburgh.
No. 6	85	80	0	30	0	4	0	...do			Chattanooga.
6 A 3	30	59	0	20	0	2	4	...do			Wheeling.
No. 7	85	80	0	30	0	3	6	...do		2	Chattanooga.
No. 7	185	102	6	32	0	7	10	...do			Duluth.
No. 7, L. K	95	70	0	22	0	4	10	...do			Wheeling.
No. 8	80	80	0	30	0	4	0	...do		2	Chattanooga.
No. 8	40	70	0	20	0	5	7	...do			Duluth.
No. 8	115	80	6	30	0	4	6	...do		2	Nashville.
No. 9	104	80	0	30	0	4	9	...do		4	Chattanooga.
9 A 3	30	59	0	20	0	2	4	...do			Wheeling.
No. 10	140	80	0	30	0	4	0	...do		4	Chattanooga.
No. 11	90	80	0	30	0	4	0	...do			Do.
No. 12	85	80	0	30	0	4	0	...do			Do.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

DERRICK BOATS—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in*				
No. 13	92	80 0	30 0	4 0	Wood		3	Chattanooga.
No. 14	90	80 0	30 0	4 0	...do			Do.
No. 14	83	80 0	30 0	4 0	...do		2	Nashville.
No. 14	190	83 11	30 5.5	6 0	...do		2	Norfolk.
No. 15	134	90 0	34 0	4 0	...do			Chattanooga.
No. 16	142	90 0	34 0	4 0	...do			Do.
No. 16, Hudson River.	170	80 0	26 6	6 0	...do	2	2	New York (1st).
No. 19, Hudson River.	170	80 9	27 4	7 6	...do	2	2	Do.
No. 20, Hudson River.	145	81 0	27 6	8 6	...do	2	2	Do.
No. 24, U. S. E. D., Wheeling.	161	75 0	35 0	4 10	...do	1	2	Wheeling.
No. 29, U. S. E. D., Kanawha.	41	62 0	24 0	3 8	...do			Do.
No. 43, U. S. E. D., Wheeling.	170	75 0	35 0	4 6	...do			Do.
No. 44, U. S. E. D., Wheeling.	160	75 0	35 0	4 6	...do			D0.
No. 63	68	65 0	30 0	5 4	...do			Cincinnati (2d).
071	170	120 0	30 0	6 0	...do		8	Vicksburg (3d M. R. C.).
No. 116	69	69 0	29 0	4 0	...do	1	20	Vicksburg.
No. 297	42	100 0	20 0	4 6	...do	1	4	Rock Island.
No. 319	65	70 0	26 0	4 0	...do	1	4	Do.
No. 476		110 0	24 0	5 0	...do			Do.
No. 503	58	66 0	22 0	4 6	...do			Do.
No. 1017	74	90 0	32 0	5 0	Creosoted wood.		5	Memphis (M. R. C 1st, 2d).
No. 1109		96 0	24 0	5 0	Wood	2	6	Vicksburg (3d M. R. C.).
No. 1311		100 0	24 0	5 0	...do	2	6	Do.
No. 1411	84	90 0	32 0	5 0	...do		5	Memphis (M. R. C., 1st, 2d).
No. 1503	150	120 0	30 0	7 0	...do		18	Vicksburg (3d M. R. C.).
No. 1504	150	120 0	30 0	7 0	...do		78	Do.
No name	43	42 11	15 11	3 9	...do		3	Norfolk.
No name		76 6	22 0	6 5	...do			Detroit.

PILE DRIVERS.

No. 1	57	76 0	19 0	4 4	Wood	2	4	Kansas City.
No. 1		80 0	24 0	4 4	...do	2	4	Do.
No. 1	75	80 0	24 0	4 0	...do			Little Rock.
No. 1	111	66 4	21 4	6 6	...do		2	Milwaukee.
No. 1	71	55 0	25 0	4 0	...do			New Orleans.
No. 1	36	60 0	22 0	3 6	...do		7	Portland, Oreg. (2d).
No. 1	20	45 3	21 0	3 6	...do			Savannah.
No. 1	75	68 0	20 0	3 1	...do		8	St. Louis.
No. 1-B	57	76 0	19 0	4 4	...do	2	4	Kansas City.
No. 1, M. R	68	50 0	26 6	4 0	...do			Pittsburgh.
No. 1, O. R	88	70 0	22 0	4 5	...do		27	Louisville.
No. 2		80 0	24 0	4 4	...do	2	4	Kansas City.
No. 2		80 0	24 0	4 0	...do			Little Rock.
No. 2	118	60 0	25 4	6 6	...do		2	Milwaukee.
No. 2[1]	127	75 6	30 0	5 0	...do			New Orleans.
No. 2	66	50 0	26 4	4 7	...do		7	Pittsburgh.
No. 2	82	70 0	24 0	4 0	...do		8	Portland, Oreg. (2d).
No. 2	56	70 0	19 0	4 6	...do	2	8	Kansas City.
No. 2, O. R	88	70 0	22 0	4 5	...do		18	Louisville.
No. 3	75	68 0	20 0	3 1	...do		8	St. Louis.
No. 3	52	66 0	23 0	3 6	...do		7	Portland, Oreg. (2d).
No. 3	63	76 0	19 0	4 4	...do	2	8	Kansas City.
No. 3, O. R	88	70 0	22 0	4 5	...do			Louisville.
No. 4	18	40 0	18 0	3 0	...do		8	Montgomery.
No. 4	75	68 0	20 0	3 1	...do		8	Memphis (M. R. C., 1st, 2d).
No. 4	63	76 0	19 0	4 4	...do	2	8	Kansas City.
No. 5	63	76 0	19 0	4 6	...do	2	8	Do.

[1] Pile driver and derrick.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

PILE DRIVERS—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
No. 5	12	40 0	18 0	3 0	Wood		8	Montgomery.
No. 5	75	68 0	20 0	3 1	...do		8	St. Louis.
No. 6	50	50 0	28 0	3 10	...do			Cincinnati (2d).
No. 6	63	76 0	19 0	4 6	...do	2	8	Kansas City.
No. VII-Y	57	76 0	19 0	4 4	...do	4	4	Do.
No. 8	63	76 0	19 0	4 4	...do	2	8	Do.
No. 9	63	76 0	19 0	4 4	...do	2	8	Do.
No. 10	56	60 0	26 0	3 10	...do		6	Duluth.
No. 11	30	80 0	22 0	4 2	...do			Montgomery.
No. 13	54	68 0	20 0	3 6	...do	1	4	St. Louis (M. R. C.).
No. 15	57	76 0	19 0	4 4	...do	4	4	Kansas City.
No. 25	75	68 0	20 0	3 1½	...do	2	8	Do.
No. 26	75	68 0	20 0	3 1	...do		8	St. Louis.
No. 28	75	68 0	20 0	3 1	...do		8	Do.
No. 29	75	68 0	20 0	3 1	...do		8	Do.
No. 30	75	68 0	20 0	3 1	...do		8	Do.
No. 31	75	68 0	20 0	3 1	...do		8	Do.
No. 32	75	68 0	20 0	3 1	...do		8	Do.
No. 33	75	68 0	20 0	3 1½	...do		5	St. Louis.
No. 33	47	66 0	18 0	4 0	...do		5	Rock Island.
No. 33	47	66 0	20 0	4 6	...do		5	Do.
No. 34	75	68 0	20 0	3 1½	...do	2	8	Kansas City.
No. 35	75	68 0	20 0	3 1½	...do		5	St. Louis.
No. 101	106	88 0	25 0	2 4	Steel	2	6	Do.
No. 102	106	88 0	25 0	2 4	...do	2	6	Do.
No. 103	106	88 0	25 0	2 4	...do	2	6	Do.
No. 104	106	88 0	25 0	2 4	...do	2	6	Do.
No. 551	84	100 0	25 0	5 0	Wood	2	8	Kansas City.
No. 971	56	76 0	25 0	3 10	...do	1	4	St. Louis (M. R. C.).
No. 981	56	76 0	25 0	3 10	...do	1	4	Do.
No. 982	56	76 0	25 0	3 10	...do	1	4	Do.
No. 983	56	76 0	25 0	3 10	...do	1	4	Do.
Lilliput	82	60 0	24 0	5 1	...do			Wilmington, N. C.
Tackle	58	64 0	28 0	3 6	...do			San Francisco (3d).

GRADERS.

Name, number, or letter.	Displacement.	Length.	Breadth.	Depth.	Material.	Officers.	Men.	District.
No. 1	280	214 0	30 0	7 7	Wood		20	New Orleans (4th M. R. C.).
No. 2	150	110 0	30 0	5 0	...do		11	Memphis (M. R. C. 1st, 2d).
No. 2	280	124 0	30 0	7 7	...do		20	New Orleans (4th M. R. C.).
No. 101	126	88 0	25 0	2 4	Steel	2	9	St. Louis.
No. 102	126	88 0	25 0	2 4	...do	2	9	Do.
No. 1011	229	120 0	30 0	6 0	Wood	3	18	Vicksburg (3d M. R. C.).
No. 1012	223	120 0	30 6	6 0	...do	3	18	Do.
No. 1013	222	120 0	30 0	6 0	...do	3	18	Do.
No. 1014	222	120 0	30 0	6 0	Steel		18	Do.
No. 1022	180	110 0	30 0	6 0	Wood		11	Memphis (M. R. C. 1st, 2d).
No. 1205	190	120 11	30 2	7 0	Steel		11	Do.
No. 1401	196	120 11	30 2	7 0	...do	1	24	Do.

DRILL BOATS.

Name, number, or letter.	Displacement.	Length.	Breadth.	Depth.	Material.	Officers.	Men.	District.
No. 1	50	65 0	20 0	3 8	Wood			Portland, Oreg. (1st).
No. 1, Columbia River.	100	100 0	26 6	4 6	...do			Seattle.
No. 1-B	76	80 0	30 0	4 0	...do		15	Chattanooga.
No. 1-H	150	80 5	30 0	4 0	...do		25	Do.
No. 1-T	85	80 0	30 6	4 6	...do		23	Do.
No. 2	45	25 0	6 0	1 0	...do			Do.
No. 2	50	65 0	20 0	3 8	...do			Portland, Oreg. (1st).
No. 2, Columbia River.	100	100 0	26 6	4 6	...do			Seattle.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

DRILL BOATS—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
No. 2-H	400	100 0	34 0	7 10	Wood		7	Chattanooga.
No. 3	50	65 0	20 0	3 8	...do			Portland, Oreg. (1st).
No. 3, Columbia River.	100	100 0	26 6	4 6	...do			Seattle.
No. 3-S	131	80 0	30 0	4 6	...do		22	Chattanooga.
No. 4-S	45	50 0	24 0	5 3	...do		18	Do.
No. 8	180	70 0	30 0	7 0	...do		9	Philadelphia.
No. 9	10	40 0	14 0	2 8	...do			Louisville.
No. 10	10	40 0	14 0	2 8	...do		3	Do.
No. 11	10	40 0	14 0	2 8	...do		3	Do.
No. 16	60	68 0	26 0	5 0	...do	1	12	Montgomery.
No. 25, Hudson River	37	34 4	15 6	4 0	...do	1	4	New York (1st).
No. 35	113	90 0	24 0	4 0	...do		18	Chattanooga.
No. 36	64	80 6	20 0	4 6	...do		12	Do.
No. 37	134	90 0	34 0	4 6	...do		14	Do.
No. 39, Hudson River	130	80 0	26 0	3 0	...do			New York (1st)
No. 46	40	80 0	24 0	4 0	...do			Montgomery.
No. 426	272	132 0	32 0	6 0	Steel		16	Rock Island.

MANEUVER BOATS.

Name, number, or letter.	Displacement.	Length.	Breadth.	Depth.	Material.	Officers.	Men.	District.
No. 1, A. R	41	56 0	18 0	3 0	Wood			Pittsburgh.
No. 1, B. R	60	70 0	22 0	4 0	...do			Dallas.
No. 1, B. S. R	75	65 0	30 0	4 10	Steel			Cincinnati (2d).
No. 1, Big Sr. R	75	80 0	30 0	4 0	Wood			Vicksburg.
No. 1, C. R	56.8	60 0	22 0	3 5	...do		5	Charleston.
No. 1, L. F	50	60 0	26 0	3 4	...do			Cincinnati (2d).
No. 1, O. R	70	60 0	22 0	4 0	...do			Pittsburgh.
No. 1, T. F	55	60 0	26 0	3 6	Steel			Cincinnati (2d).
No. 1, T. R	39	44 0	20 0	3 7	Wood		7	Dallas.
No. 1, U. S. E. D., Wheeling.	101	60 0	26 0	3 8	Steel			Wheeling.
No. 2	95	90 0	20 0	4 0	Wood			Cincinnati (1st).
No. 2, B. S. R	55	60 0	26 0	3 6	Steel			Cincinnati (2d).
No. 2, O. R	70	60 0	22 0	3 8	...do			Pittsburgh.
No. 2, T. R	30	44 0	20 0	3 7	Wood			Dallas.
No. 2, U. S. E. D., Wheeling.	101	60 0	26 0	3 8	Steel			Wheeling.
No. 3, B. R	55	60 0	28 0	3 0	Wood			Dallas.
No. 3, B. S. R	55	60 0	26 0	3 6	Steel			Cincinnati (2d).
No. 3, O. R	54	60 0	20 0	4 0	Wood			Pittsburgh.
No. 3, U. S. E. D., Wheeling.	101	60 0	26 0	3 8	Steel			Wheeling.
No. 4, O. R	58	60 0	22 0	3 8	Wood			Pittsburgh.
No. 4, Oa. R	36	60 0	25 0	4 0	...do			Vicksburg.
No. 4, T. R	25	44 0	20 0	3 7	...do			Dallas.
No. 5, O. R	65	60 0	22 0	3 8	...do			Pittsburgh.
No. 6, B. R	55	60 0	28 0	3 0	...do			Dallas.
No. 6, O. R	41	56 0	18 0	3 0	...do			Pittsburgh.
No. 6, Oa. R	75	80 0	30 0	4 0	...do		7	Vicksburg.
No. 6, T. R	32	44 0	20 0	3 7	...do			Dallas.
No. 7, O. R	76	60 0	22 0	3 8	Steel			Pittsburgh.
No. 7, T. R	37	44 0	20 0	3 7	Wood			Dallas.
No. 8, B. R	55	60 0	28 0	3 0	...do			Do.
No. 8, O. R	65	60 0	22 0	3 8	...do			Pittsburgh.
No. 8, Oa. R	50	60 0	25 0	4 0	...do			Vicksburgh.
No. 9, O. R	76	60 0	22 0	3 8	Steel			Pittsburgh.
No. X, B. S. R	65	65 0	30 0	5 2	Wood			Cincinnati (2d).
No. 10, O. R	87	60 0	22 0	4 0	Steel			Pittsburgh.
No. 10, U. S. E. D., Wheeling.	60	60 0	22 0	3 8	Wood			Wheeling.
No. 11, U. S. E. D., Wheeling.	60	60 0	22 0	3 8	...do			Do.
No. 20, T. R	21	44 0	20 0	3 7	...do			Dallas.
No. 22, U. S. E. D., Wheeling.	60	60 0	22 0	3 8	...do			Wheeling.
No. 23, U. S. E. D., Wheeling.	60	60 0	22 0	3 8	...do			Do.
No. 25, T. R	35	44 0	20 0	3 7	...do			Dallas.
No. 29	53.3	60 0	22 0	3 10	Steel			Cincinnati (1st).

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

MANEUVER BOATS—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
No. 32, U. S. E. D., Wheeling.	74	60 0	22 2	3 8	Wood			Wheeling.
No. 37	71	75 0	22 0	3 3	...do			Cincinnati (1st).
No. 37, U. S. E. D., Wheeling.	82	60 0	22 0	3 8	Steel			Wheeling.
No. 38, U. S. E. D., Wheeling.	82	60 0	22 0	3 8	...do			Do.
No. 39, U. S. E. D., Wheeling.	82	60 0	22 0	3 8	...do			Do.
No. 40, U. S. E. D., Wheeling.	82	60 0	22 0	3 8	...do			Do.
No. 41 A, O. R.	71	73 7	22 5	4 9	Wood		7	Louisville.
No. 41 B, O. R.	71	73 7	22 5	4 9	...do		9	Do.

TUG AND SURVEY BOATS, SCREW (STEAM).

Name, number, or letter.	Displacement.	Length.	Breadth.	Depth.	Material.	Officers.	Men.	District.
Adams, H. M	95	78 4	18 9	7 6	Wood	2	2	Portland, Oreg. (2d).
Angler	95	91 3	17 2	10 0	...do			Savannah.
Arago	90	89 6	18 0	9 0	...do	2	7	Portland, Oreg. (2d).
Ariadne	8	45 6	9 0	4 0	...do			Milwaukee.
Boaz	55	65 0	16 3	7 0	Iron	2	3	Vicksburg (M. R. C. 3d).
Camden	170	80 0	20 0	9 0	Steel	2	5	Philadelphia.
Casey, Thomas Lincoln.	90	70 0	15 0	8 0	...do	2	2	Buffalo.
Castle	165	95 0	20 2	10 6	...do	2	6	Washington, D. C
Caswell, Richard	200	84 9	18 6	10 0	...do	2	7	Wilmington, N. C.
Cerberus	226	109 3	23 0	12 6	...do	4	5	New York (super. of N. Y. Harbor).
Chickasaw	155	109 0	20 0	9 9	...do	2	6	Mobile.
Chipeta	45	76 8	14 10	8 4	Wood	2	1	Norfolk.
Circle	38	53 6	14 3	6 6	...do	2	1	Duluth.
Coquet	100	63 0	18 6	7 0	...do	2	6	Wilmington, N. C.
Cynthia	135	74 7	17 10	7 10	...do	2	6	Do.
Dearborn	9	50 0	8 9	4 9	Steel			Chicago.
Donovan, C	180	95 0	19 2	10 0	...do	2	4	New Orleans.
Engineer	298	106 0	20 0	11 0	...do			Manila.
Essayons	130	85 0	21 0	11 6	...do	2	3	Duluth.
Gem	10	45 2	9 3	4 6	Wood			Savannah.
Gibbons	124	61 0	19 9	8 8	...do	2	11	Do.
Gillmore, Gen	47	61 6	15 0	4 10	...do	2	1	Grand Rapids.
Gwendolen	8	30 0	8 0	4 6	...do	1	1	Buffalo.
Hancock	120	97 10	17 6	7 6	...do	2	7	Grand Rapids.
Harding, Horace	215	90 6	23 1	10 6	...do	2	6	Mobile.
Harwood, Col	107	80 0	17 8	9 6	...do	1	3	Boston.
Industry	110	71 8	16 0	7 10	...do	4	4	Milwaukee.
Inspector, M. R. C.[1]	258	144 0	26 0	6 0	Steel	3	11	St. Louis (M. R. C.)
Lamont	216	108 8	22 11	12 6	...do	4	5	New York (super. of N. Y. harbor).
Lusk, Col. J. L	295	123 11	19 4	11 10	Wood	2	12	Detroit (Lake Survey).
Lydecker, Gen. G. J	120	125 0	18 3	10 0	...do	1	8	Detroit.
Manchac	113	78 0	17 0	7 0	...do	2	5	New Orleans (M. R. C. 4th).
Manisees	225	106 0	22 0	9 0	...do	4	5	New York (2d).
Manitowoc	200	100 0	21 6	10 7	Steel	4	6	Milwaukee.
Marengo	137	82 0	19 4	8 8	...do	2	5	New Orleans (M. R. C. 4th).
Mendell, G. H	150	101 0	21 2	10 0	Wood	2	7	Portland, Oreg. (2d).
Mercur	60	83 0	13 3	7 0	Steel	2	3	Wilmington, N. C.
Morganza	180	94 0	20 4	10 3	...do	2	5	New Orleans (M. R. C. 4th).
Nimrod	245	106 11	22 8	10 8	Wood	4	5	New York (super. of N. Y. Harbor).
Noble, Alfred	83	76 6	15 6	7 0	Steel	1	3	Detroit.
Philadelphia	55	67 0	16 0	7 6	...do	2	5	Philadelphia.
Picket	32	52 5	11 11	6 3	Wood	1	3	New Orleans.
Pontonier	50	80 0	18 0	3 6	Steel	2	2	Washington Barracks, D. C.

[1] Twin-screw tunnel boat.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

TUG AND SURVEY BOATS, SCREW (STEAM)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
Post, J. C	95	78 4	18 9	7 6	Wood	2	2	Portland, Oreg. (2d).
Quest	46	65 0	15 0	8 0	...do	2	3	Cleveland.
Reese, Gen	29	48 0	12 0	5 0	...do	1	3	New Orleans.
Rumsey, James	127	120 0	22 0	4 3	Steel	1	7	Wheeling.
San Luis	161	121 0	26 0	13 3	...do			Galveston.
Sapper	100	76 4	16 10	9 6	Wood	1	3	Detroit.
Scout	195	106 1	20 10	10 8	Steel	4	5	New York (super. of N. Y. Harbor).
Search	200	138 10	28 9	4 10	Wood	3	10	Detroit (Lake Survey).
Sears, Gen. C. B	260	110 7	22 0	12 0	Steel			Duluth.
Sentinel	170	95 0	20 0	10 6	...do	3	6	Baltimore.
Spear	160	87 0	19 8	11 0	Wood	2	4	Cleveland.
Surveyor	176	98 0	20 1	8 5	...do	2	12	Detroit (Lake Survey).
Sydney, C	124	73 6	19 0	9 0	...do	2	3	Savannah.
Talfor, Capt	130	80 0	16 2	8 0	...do	2	5	Galveston.
Thayer, Col	84	61 0	16 10	6 10	...do			New York (1st).
Tickfaw	217	94 0	20 4	10 0	Steel	2	5	New Orleans (4th M. R. C.).
Tonty	120	96 0	16 0	5 6	...do	2	5	New Orleans.
Totten, Gen	35	63 7	17 1	6 11	Wood	1	4	New York (1st).
Tunica	205	90 0	20 4	9 8	Steel	2	5	New Orleans (4th M. R. C.).
Tuscaloosa	212	92 0	23 0	8 0	Wood	2	6	Mobile.
Uacha	43	62 0	12 0	7 5	Iron	2	3	New Orleans.
Vidette	200	105 0	21 0	10 0	Steel	4	8	Philadelphia.
Vigilant	208	114 5	22 8	12 0	...do	4	7	New York (super of N. Y. Harbor).
West Neebish	47	59 5	12 1	6 6	Wood	1	2	Detroit.
Whitewater	61	83 0	19 0	9 0	Iron	2	3	Vicksburg (3d M. R. C.).
Wilson	106	96 0	19 6	11 0	Steel	3	9	Seattle.
No. 1, U. S. L. S	56	70 1	13 6	6 6	Wood	2	4	Detroit (Lake Survey).
No. 2, U. S. L. S	48	70 3	14 6	7 6	...do	2	6	Do.

STEAM LIGHTERS.

Name, number, or letter.	Displacement.	Length.	Breadth.	Depth.	Material.	Officers.	Men.	District.
Executive	236	86 3	20 0	8 5	Wood	1	3	Boston.
Rockaway	300	110 0	30 0		...do	4	7	New York (2d).
No. 10	110	80 0	28 0	4 0	...do			Charleston, S. C.
No. 11	149	70 0	22 0	6 10	...do			Do.

TOW AND SURVEY BOATS, PADDLE (STEAM).

Name, number, or letter.	Displacement.	Length.	Breadth.	Depth.	Material.	Officers.	Men.	District.
Ada	25	76 0	18 0	3 0	Wood	2	4	Rock Island.
Alabama	219	134 5	25 6	4 4	...do	4	14	Montgomery.
Alert	135	115 0	19 6	3 10	...do	2	9	Rock Island.
Allen, A. D	150	137 10	28 6	4 0	...do	2	6	Little Rock.
Augustin, Lieut	191	136 0	25 6	5 0	Steel	2	7	Kansas City.
Aux Vasses	50	70 0	18 0	3 6	Wood	1	4	St. Louis.
Baldwin, Edwin M	191	137 9	25 3	5 0	Steel	2	8	Kansas City, Mo.
Bonneville	93	127 8	22 9	4 0	Wood	2	7	Do.
Boone, Daniel	86	117 6	22 7	4 0	...do	2	7	Do.
Cayuga	254	163 8	31 1	4 3	Steel	1	8	Cincinnati (1st).
Chalmette	132	105 0	21 0	5 0	Wood	2	5	New Orleans (4th M. R. C.).
Cherokee	278	142 5	27 6	5 1	Steel	2	7	Louisville.
Chickamauga	112	100 0	22 5	3 0	Wood			Chattanooga.
Chilhowee	104	100 0	19 0	3 6	...do	1	5	Do.
Chisca	450	185 6	30 3	5 0	...do	4	13	Memphis (M. R. C. 1st, 2d).
Choctaw	560	199 4	36 0	5 6	Steel	2	12	St. Louis (M. R. C.).
Coal Bluff	230	128 0	25 0	4 6	...do	2	9	Rock Island.
Colbert	185	158 0	25 6	4 6	...do	1	9	Chattanooga.
Columbus	231	154 0	28 0	4 0	...do	3	24	Montgomery.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

TOW AND SURVEY BOATS, PADDLE (STEAM)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
Comanche	200	120 0	27 0	5 1	Steel	2	8	Chicago.
Control	232	157 0	26 6	4 8	Wood	4	10	Vicksburg (3d M. R. C.).
Coppee, H. St. L.	350	166 0	30 0	6 0	Steel	8	18	Do.
Craighill, Gen	198	133 9	28 0	4 3	...do	2	5	Wheeling.
Crozet	54	115 0	19 0	3 0	Wood	......	......	Do.
Elinor	213	125 0	25 0	4 0	...do	2	12	Rock Island.
Ellen	200	124 0	26 6	4 5	...do	1	7	Do.
Elsie	40	67 0	13 0	3 0	Steel	2	5	Do.
Emerald	28	76 9	14 0	3 3	Wood	1	3	Louisville.
Emily	25	67 0	12 0	3 0	...do	2	3	Rock Island.
Ewens, John	162	136 6	21 0	4 10	Steel	3	12	St. Louis (M. R. C.).
Fox	19	66 6	12 3	3 0	Wood	2	3	Chicago.
Fox	128	107 9	18 4	5 0	...do	3	4	Milwaukee.
Fury	110	113 0	22 0	3 10	...do	2	7	Rock Island.
Grace	38	79 0	17 0	3 11	...do	2	3	Do.
Graham	138	136 1	27 8	4 0	...do	3	7	Memphis (M. R. C. 1st, 2d).
Gregory	240	131 0	22 0	4 2	...do	2	6	Cincinnati (2d).
Gurney, Lieut	191	136 0	25 6	5 0	Steel	2	7	Kansas City.
Guyandot	229	157 11	31 1	4 3	Steel and iron.	1	8	Cincinnati (1st).
Henry	34	87 0	18 8	3 2	Wood	1	4	Nashville.
Hider, Arthur	350	163 0	30 0	6 0	Steel	8	18	Vicksburg (3d M. R. C.).
Hiwassee	135	115 5	22 11	3 10	Wood	1	5	Nashville.
Hyacinth	75	102 6	18 0	2 6	...do	2	6	New Orleans.
Isle de Bois	50	70 0	18 0	3 3	...do	1	4	St. Louis.
Issaquena	441	145 6	30 0	6 0	Steel	8	18	Vicksburg (3d M. R. C.).
Itasca	80	94 0	15 5	5 0	Iron	2	2	Memphis (M. R. C. 1st, 2d).
John	34	87 0	18 8	3 2	Wood	1	4	Nashville.
Jupiter	120	118 0	20 0	4 6	Steel	......	......	St. Louis (M. R. C.).
Kaskaskia	150	100 0	24 0	4 3	...do	1	4	St. Louis.
Keith, George G	94	127 8	22 9	4 0	Wood	2	7	Kansas City, Mo.
King, Col. W. R	37	78 7	15 1	3 0	...do	1	4	Chattanooga.
King, Wm. R	716	190 0	41 0	5 0	Steel	6	26	St. Louis.
Kittaning	135	118 0	20 0	3 6	...do	1	5	Pittsburgh, Pa.
Lafourche	300	136 0	27 10	5 6	...do	3	9	New Orleans (4th M. R. C.).
Le Claire	285	125 4	31 0	4 0	...do	2	9	Rock Island.
Leota	167	137 0	23 0	4 6	Wood	2	4	Montgomery.
Leota	560	199 4	36 0	5 6	Steel	2	12	St. Louis (M. R. C.).
Lewis, Lieut	191	136 0	25 6	5 0	...do	2	7	Kansas City, Mo.
Lookout	180	135 0	25 0	4 4	Wood	1	7	Chattanooga.
Louise	25	61 0	12 0	3 2	Steel	2	3	Rock Island.
Lucia	25	68 0	12 8	3 0	Wood	1	4	Do.
Mac	35	73 0	16 0	3 3	...do	2	3	Do.
Marion	54	80 0	18 0	3 0	...do	2	4	Do.
Mars	83	94 6	17 0	3 9	Steel	1	6	St. Louis (M. R. C.).
Maude Kilgore	82	130 6	24 2	4 4	Wood	......	......	Memphis (M. R. C. 1st, 2d).
McPherson	113	115 0	20 6	3 6	...do	1	9	Chattanooga.
Meramec	150	100 0	24 0	4 3	Steel	1	4	St. Louis.
Mercury	83	94 6	17 0	3 9	...do	1	6	St. Louis (M. R. C.).
Merrill	163	131 6	23 0	3 6	Wood	1	7	Cincinnati (2d).
Miami	229	157 11	31 1	4 3	Steel and iron.	1	8	Cincinnati (1st).
Minneapolis	285	125 4	31 0	4 0	Steel	2	9	Rock Island.
Minnetonka	490	204 2	29 6	5 4	Wood	4	13	Memphis (M. R. C. 1st, 2d).
Mississippi	540	200 11	32 0	6 0	Steel	4	36	St. Louis (M. R. C.).
Muscatine	285	125 4	31 0	4 0	...do	2	9	Rock Island.
Nauvoo	285	125 4	31 0	4 0	...do	2	9	Do.
Newton, Gen. J	560	175 0	24 0	7 6	...do	3	9	New Orleans (4th M. R. C.).
Nokomis	560	199 4	36 0	5 6	...do	2	12	St. Louis (M. R. C.).
Nolty, Augustus J	150	136 0	25 1	5 0	...do	3	10	Memphis (M. R. C. 1st, 2d).
Nugent	191	141 3	24 6	4 3	Wood	3	10	Mobile.
Ocoee	120	115 0	22 0	3 0	...do	......	......	Chattanooga.
Osage	39	68 8	15 1	3 2	...do	2	2	Kansas City.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

TOW AND SURVEY BOATS, PADDLE (STEAM)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
Ottawa	254	163 8	31 1	4 3	Steel	1	8	Cincinnati (1st).
Pearl	40	85 1	18 0	4 0	Wood	2	4	Chicago.
Plaquemine	300	136 0	28 0	5 6	Steel	3	9	New Orleans (4th M. R. C.).
Rees, W. M	150	136 0	25 1	5 0	...do...	3	10	Memphis (M. R. C. 1st, 2d).
Roberts, T. P	206	133 2	22 10	5 0	Wood	2	7	Pittsburgh.
Ruth	40	75 0	17 0	2 3	...do...	2	4	Rock Island.
Sachem	560	199 4	36 0	5 6	Steel	2	12	St. Louis (M. R. C.).
Salvisi	150	100 0	24 0	4 3	...do...	1	6	St. Louis.
Saturn	120	118 0	20 0	4 6	...do...			St. Louis (M. R. C.)
Scioto	229	157 11	31 1	4 3	Steel and iron.	1	10	Cincinnati (1st).
Search	200	135 3	22 3	4 0	Wood	3	10	Memphis (M. R. C. 1st, 2d).
Shawnee	83	117 0	25 4	3 6	...do...	2	5	Louisville.
Simpson, Gen. J. H	525	170 0	32 0	5 0	...do...	6	23	St. Louis.
Slackwater	242	137 8	26 10	4 4	...do...	2	21	Pittsburgh.
Teche	90	100 0	20 4	5 0	Steel	3	9	New Orleans, (4th M. R. C.).
Tensas	78	93 6	20 4	4 11	...do...	2	5	Do.
Vega	112	118 6	19 2	4 0	Wood	1	7	Cincinnati (2d).
Venus	83	94 6	17 0	3 9	Steel	1	6	St. Louis (M. R. C.).
Vulcan	83	95 0	17 0	3 9	...do...	1	6	Do.
Warioto	235	141 0	27 0	5 1	...do...	1	5	Nashville.
Wave Rock	28	65 10	14 0	2 6	Wood		4	Louisville.
Wolf	114	89 0	19 0	4 6	...do...	3	2	Milwaukee.
Woodland	75	97 0	24 0	4 6	...do...	2	2	Portland, Oreg. (2d).
Wynoka	560	199 4	36 0	5 6	Steel	2	12	Memphis (M. R. C. 1st, 2d).

GASOLINE LAUNCHES (SCREW).

Name, number, or letter.	Displacement.	Length.	Breadth.	Depth.	Material.	Officers.	Men.	District.
Absecon		20 0	6 6	3 0	Wood			Wilmington, Del.
Alafia	0.65	18 0	5 10	2 5	...do...			Jacksonville, Fla.
Albatross	1.7	31 6	7 0	2 10	...do...			Pittsburgh.
Alma		28 0	5 1	1 8	...do...			Rock Island.
Amelia		35 0	8 0	3 6	...do...			Savannah.
Amite	1.3	20 11	3 11	2 4	...do...			New Orleans.
Ana		18 3	4 6	1 4	...do...			Washington, D. C.
Anahuac	2	28 0	8 2	3 6	...do...	1		Galveston.
Animiki	11	55 0	11 10	4 3	...do...			St. Paul.
Ariel	6	31 0	7 3	4 7	...do...		1	Cleveland.
Arrow	2	31 0	7 0	4 0	...do...		2	Montgomery.
Averill		36 0	10 6	4 6	...do...	1	1	Washington, D. C.
Balize	11	41 6	12 3	4 9	...do...		3	New Orleans.
Bastrop	16	46 6	11 6	5 0	...do...	1	1	Galveston.
Beatrice		30 0	6 6	3 2	...do...			New Orleans (4th M. R. C.).
Beaumont	32	58 2	13 7	8 5	...do...	1	2	Dallas.
Bell		16 4	4 4	1 8	...do...			Washington, D. C.
Benwood	20	26 0	6 0	3 0	Steel			Wheeling.
Biloxi	25	40 0	13 0	4 7	Wood	2	1	Mobile.
Birch	1.5	28 0	6 6	2 6	Steel			St. Louis.
Black Rock	1	25 0	7 3	4 3	...do...		1	Buffalo.
Boeuf		14 0	4 5	2 8	Wood			New Orleans.
Bolivar	.9	25 0	5 0	1 11	...do...		1	St. Louis (M. R. C.).
Bonne Femme		24 8	5 6	2 5	Steel			Kansas City.
Bon Homme	1.3	21 7	4 11	1 7	Wood		1	Do.
Brunswick	43.5	60 0	15 0	6 0	Steel	2	1	Savannah.
Bug	10	38 0	10 8	6 2	Wood		2	Detroit.
Bull Calf	1	23 0	6 0	3 4	...do...		1	St. Paul.
Burton No. 22	.9	20 0	4 2	2 3	...do...			Cleveland.
Caddo	2.5	30 0	8 0	3 0	...do...			Dallas.
Calcasieu	5.6	37 10	10 9	4 0	...do...		1	New Orleans.
Carp	2	24 8	5 0	2 0	...do...			Montgomery.
Carroll	15	51 5	11 5	4 0	...do...	1	1	Vicksburg (3d M. R. C.).
Catoma	2	25 0	7 3	2 0	...do...			Montgomery.
Cavallo	12	39 10	8 10	5 9	...do...	1	1	Galveston.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

GASOLINE LAUNCHES (SCREW)—Continued.

Name, number, or letter.	Displacement.	Dimensions.						Material.	Complement.		District.
		Length.		Breadth.		Depth.			Officers.	Men.	
	Tons.	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*				
Cerritos	7.8	36	6	9	6	4	9	Wood		1	Los Angeles.
Charette		30	0	5	6	3	0	do		1	Kansas City.
Chariton	1	24	0	5	0	2	1½	do		1	Do.
Chica	.35	19	6	5	5	2	7	do			Jacksonville.
Chicago	53	75	0	15	6	4	6	do	1	4	Chicago.
Chico	.6	20	0	5	0	2	2	Steel			Cincinnati (1st).
Chicot	4.2	35	5	6	6	3	0	do			Vicksburg (3d M. R. C.).
Chipola	7	42	0	8	6	7	0	Wood		2	Montgomery.
Chippewa		35	0	6	0	2	6	do		1	Rock Island.
Clermont	.9	25	11	6	0	3	0	do			Cincinnati (1st).
Clinch	3.3	35	0	8	0	3	9	do		1	Chattanooga.
Clyde	9	42	0	9	8	4	0	do			San Francisco (1st).
Cockspur	1.4	20	0	6	0	2	9	do			Savannah.
Colonel	31	66	8	12	6	5	6	do	2	2	Galveston.
Commodore	1	23	4	6	0	3	2	do			Do.
Coot	1.5	21	0	4	7	2	0	do			Montgomery.
Copano	12	28	6	7	0	4	4	do	1		Galveston.
Cordova		26	0	5	0	1	6	do			Rock Island.
Corvi	2	18	6	4	10	2	4	do		1	Jacksonville.
Cosine	4	25	0	6	6	2	6	do			Savannah.
Coyote	2	28	0	5	6	3	0	do			Portland, Oreg. (1st).
Curve	2	22	6	5	5	2	7	do		1	Duluth.
Custodian		23	6	6	6	3	0	do			Wilmington, Del.
D'Armit	4.3	35	0	8	3	4	6	do			Jacksonville.
Dauphin	58.7	80	4	17	1	4	6	do	2	4	Mobile.
Dawho	25	60	0	13	0	8	0	do	2	1	Charleston.
Delafield	8	39	6	9	6	6	6	do		1	New York (1st).
Delaware	2	20	2	6	8	3	2	do			Philadelphia.
Derby, Capt. Geo. H.	15.1	44	0	10	8	6	10	do		1	New York (1st).
De Soto	14	57	6	10	7	5	1	do	2	8	Jacksonville.
Dolly	2.5	25	2	5	10	2	6	do			Portland, Oreg. (2d).
Don	9	41	9	9	7	3	6	do	1	1	Detroit.
Dora		24	0	5	0	2	0	do			San Francisco (1st).
Du Brie	1.9	28	6	5	0	3	8	do		1	Louisville.
Echo River	6	40	5	9	6	4	8	do		1	Do.
Ellis	7.5	33	0	9	2	3	1	do		1	New London.
Engineer	10	37	6	7	8	3	0	do			Grand Rapids.
Engineer	4	30	0	6	6	2	8	do		1	Washington Barracks, D. C.
Engineer, U. S	6.3	30	0	6	5	2	2	do		1	Newport.
Enquirer		30	4	7	0	3	0	do			Kansas City.
Etowah	2	25	6	6	6	2	10	do			Montgomery.
Eudora	1	20	0	5	0	1	6	Galv. iron		1	Nashville.
Eufaula	.8	27	6	7	3	2	4	Wood			Montgomery.
Eureka	3	25	0	8	6	3	4	do			Portland, Oreg. (2d).
Faber	10	42	0	10	0	4	0	do		3	Wilmington, N. C.
Flirt	1	23	7	5	4	2	4	do		1	Kansas City, Mo.
Frances	7	43	0	7	10	4	0	do		2	Wilmington, N. C.
Franklin	3	29	0	7	0	3	10	Steel		1	Vicksburg.
Freak	2.5	27	0	8	0	3	0	Wood		1	Jacksonville.
"G"	1.5	25	7	8	2	3	6	do	1	1	Galveston.
Galena		35	0	6	0	2	6	Steel		1	Rock Island.
Ganawada	4	32	0	5	6	2	6	Wood		1	New York (1st).
Gannet	20	72	0	12	6	5	2	do	1	3	Wilmington, Del.
Gazelle	73	66	5	18	2	10	7	do	1	4	Newport.
Granby	.60	16	0	4	0	1	2	do			Charleston, S. C.
Hancock No. 2	2.5	16	0	5	0	2	4	do			Grand Rapids.
Harpeth	1.75	26	0	6	0	2	2	Steel			Nashville.
Hartrick, E. M	42	60	0	15	1	7	0	Wood			Galveston.
Helen	33	56	0	12	4	5	9	do	1	1	Do.
Heron	11	36	0	9	6	4	5	do		1	Milwaukee.
Hiawatha		35	0	6	0	2	6	do			Rock Island.
Hidalgo		28	3	8	3	4	0	do		1	Galveston.
Hill	6.9	31	5	7	7	2	6	do	1	1	Do.
Hinda	1.8	28	0	7	6	4	3	do		2	Wilmington, Del.
Hurricane	1.5	24	2	5	4	1	10	do		1	Kansas City.
Hydrog	1	24	10	5	7	1	7	do		1	St. Louis (M. R. C.).
Ingalls, Gen	8	43	0	8	4	4	9	do	2		New York (2d).
Ino	2	27	10	8	4	4	0	do		1	Dallas.
Inspector	6	32	2	6	6	4	7	do		1	Cleveland.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

GASOLINE LAUNCHES (SCREW)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
Inspector	26	50 3	8 9	4 8	Steel		2	Detroit (Lake Survey).
Inspector No. 1	3	25 0	5 6	3 0	...do		1	Little Rock, Ark.
Iris	4	28 0	7 0	3 0	Wood		2	Detroit.
Jefferson	2	30 7	7 0	5 6	...do			Dallas.
Jennie	5	30 0	8 0	3 2	...do			Protland, Oreg. (1st).
Jolly		26 0	5 3	1 3	...do			Rock Island.
Juanita	1	22 0	6 0	2 2	...do		1	Dallas.
Katharine	2	30 5	7 11	3 11	...do			New London.
Kern	3.7	30 0	6 10	3 2	...do		1	San Francisco (1st).
Kingfisher	19	41 1	11 0	4 0	...do		2	Milwaukee.
Krey, John	7	35 5	8 0	5 0	...do			Wilmington, N. C.
Laura	6	40 9	6 7	4 2	Steel		2	Louisville.
Lavaca	4	26 0	6 1	2 0	Wood	1		Galveston.
Leach, Col	5.3	36 4	10 6	4 3	...do			Washington, D. C.
Leaf	4.5	32 0	7 6	4 0	...do	1		Mobile.
Leslie	7	36 0	8 6	4 6	...do		1	Galveston.
L'Eau Noir	7.6	40 0	9 3	5 6	...do		2	Vicksburg.
Liberty	2	26 0	7 0	2 10	...do		1	Dallas.
Long, J. C	12	42 0	8 5	3 7	Steel		2	Rock Island.
Long Point	5	38 0	9 6	4 0	Wood		2	Norfolk.
Lookout	3	30 0	6 6	3 9	...do			New York (super. of N. Y. Harbor).
Louise	13	40 0	10 0	5 0	...do		1	Charleston.
Ludington	1.5	22 4	5 0	2 4	...do		1	Grand Rapids.
Luzon	12	53 0	9 4	4 9	...do	1	1	Pittsburgh.
Lydecker, Gen. G. J., No. 1.		20 6	5 0	2 0	...do			Detroit.
Lydecker, Gen. G. J., No. 2.		15 6	4 6	1 9	...do			Do.
Maguire, Capt	49	67 0	17 7	4 2	...do	2	5	Jacksonville.
Mai Muat		30 6	8 4	3 6	...do		1	Honolulu.
Mallard	8	35 0	9 0	4 2	...do		1	Milwaukee.
Mamie K	2	25 0	6 0	2 7	...do	1		Mobile.
Mansker	.5	20 0	5 0	2 0	...do		1	Nashville.
Marie	3	29 0	8 0	3 11	...do		1	New York (1st).
Manteo	37	52 0	18 8	8 0	...do	2	1	Wilmington, N. C.
Maurepas	5.5	36 8	10 8	4 0	...do		1	New Orleans.
Meyler, Capt. J. J	44	70 6	15 0	7 8	...do	2	3	Jacksonville.
Mezquite	4	30 6	7 4	3 6	...do	1	1	Galveston.
Mignon	.5	18 4	5 2	2 1	Steel			Cincinnati (1st).
Mifflin	49	79 10	11 5	4 0	Wood	2	2	Philadelphia.
Millville	1	22 6	6 6	2 6	...do		1	Norfolk.
Minnehaha		35 0	6 0	2 6	...do			Rock Island.
Minneiska		35 0	6 0	2 6	...do		1	Do.
Minquas		18 2	6 3	2 11	...do		1	Wilmington, Del.
Mohawk	5.5	35 0	8 6	3 9	...do			Portland, Oreg. (2d).
Moniteau	1	24 0	5 0	1 10	...do		1	Kansas City.
Monomoy	62	82 9	15 6	9 6	...do	2	5	Newport.
Monroe	4	40 0	8 6	4 0	...do		2	Wheeling.
Moreau		20 0	5 1	2 1	Steel			Kansas City.
Mulberry	2.6	35 0	6 10	3 10	Wood	1	1	Mobile.
Munden	1	22 6	6 6	2 6	...do		1	Norfolk.
Murrelet	2.5	24 0	6 5	2 6	...do			Portland, Oreg. (1st).
Mustang	2.5	20 0	5 2	2 0	...do	1		Galveston.
Myra	10	40 0	7 4	3 6	...do			Rock Island.
Nancy	7.8	30 0	7 0	2 0	...do		2	Wilmington, N. C.
Nanina	5	42 4	7 5	3 11	...do		2	Wheeling.
Nassau	1.2	23 10	7 1	3 10	...do		1	Jacksonville.
Neches	1.1	26 0	6 0	2 4	Steel		1	Dallas.
Nehalem		30 0	8 9	3 6	Wood		1	Portland, Oreg. (1st).
Nell	1.5	25 0	5 6	2 3	...do			Cincinnati (1st).
Nemadji	20	60 9	12 0	6 2	...do	2	1	Duluth.
Neptune	3.3	32 0	5 4	3 6	...do		1	New Orleans (4th M. R. C.).
Netnowka	10	37 7	7 4	5 6	...do		2	Detroit (Lake Survey).
Neuse	34.6	62 5	15 0	14 3	...do	1	3	Wilmington, N. C.
New Castle	1.5	23 0	7 0	2 8	...do			Philadelphia.
Niangua		30 0	5 6	3 0	...do		1	Kansas City.
Nodin		30 3	5 8	2 10	...do		1	St. Paul.
Nola	8.5	35 0	7 6	4 6	...do		1	Honolulu.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

GASOLINE LAUNCHES (SCREW)—Continued.

Name, number, or letter.	Displacement.	Dimensions.						Material.	Complement.		District.
		Length.		Breadth.		Depth.			Officers.	Men.	
	Tons.	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*				
Norka	22	62	0	14	0	6	1	Wood	1	3	Portland, Me.
Norva	6.5	36	10	10	6	4	3	do	2		Norfolk, Va.
Nueces	6	31	0	8	0	3	0	do	1		Galveston.
Obion	.9	25	0	5	0	1	11	do		1	St. Louis (M. R. C.).
Ocia	2	30	0	5	0	3	0	do			Portland, Oreg. (1st).
Okisko	15	41	0	11	6	6	0	do	2	1	Norfolk.
Olive	5	34	0	8	0	3	2	do		1	Wilmington, N. C.
Ontario		27	0	6	3	4	0	do		1	Buffalo.
Oostenaula	.2	25	0	6	0	3	2	do			Montgomery.
Opelika	37	60	6	12	6	5	3	do	2	1	Memphis (M. R. C. 1st, 2d).
Orcas	45	70	6	14	0	3	7	do	2	2	Seattle.
Oskar	1.5	20	0	5	1	3	0	do		1	Duluth.
Ouachita	17	65	6	10	5	4	0	Steel	2	2	Vicksburg.
Padre	3.6	22	0	5	0	3	5	Wood		1	Galveston.
Palacios	3	26	6	7	0	5	10	do	1		Do.
Palouse	2	27	9	4	8	2	9	do		1	Portland, Oreg. (1st)
Pathfinder	10	38	0	9	6	6	5	do		2	Baltimore.
Papoose	6	30	3	8	0	4	0	do	1		Portland, Oreg. (2d)
Paquippe	65	82	9	15	6	9	6	do	3	4	Norfolk.
Pearl	5	40	0	7	6	4	0	do		2	Cincinnati (2d).
Pequot	2.5	28	3	7	4	4	6	do		1	New London.
Pioneer	6	35	0	8	6	4	0	do		1	Cincinnati (2d).
Plebe	19	56	0	9	0	5	0	do	1	1	Boston.
Polly	2	16	0	4	6	2	6	Steel		1	Wilmington, N. C.
Powhatan	6.4	40	2	10	2	4	3	do	2		Norfolk.
Primary	1.3	18	5	5	0	2	0	Wood			Montgomery.
Pulaski	2	22	0	7	0	3	0	do			Savannah.
Quincy		35	0	6	0	2	6	do			Rock Island.
Racket	1	22	6	4	7	1	7	do		1	Kansas City.
Relee	5.3	30	0	7	6	3	1	Steel			Washington, D. C.
Rettig	25	40	9	12	3	4	6	Wood	2	1	Mobile.
Rio Vista	45.5	60	0	16	0	7	0	do		2	San Francisco (3d).
Rocks	5	26	0	7	3	4	0	do			Wilmington, N. C.
Roland	2	24	0	4	10	3	4	Steel		1	Vicksburg.
Salem	6.5	35	0	9	0	3	6	Wood	1		Portland, Oreg. (2d).
Salvador	13.8	41	0	9	6	4	0	Steel			New Orleans.
Santa Rosa	64	70	0	16	0	8	0	do	1	4	Montgomery.
Scajaquada	65	82	9	15	6	9	6	Wood	2	3	Buffalo.
Schuyler	1.2	25	0	5	8	1	10	Steel			New York (2d).
Scorpion		28	0	4	6	2	4	Wood		1	Rock Island.
Sea Gull	7	38	0	10	0	3	9	do		1	Chicago.
Seminole	8	36	4	10	6	5	10	do		1	Do.
Seneca	7.3	40	0	8	0	2	9	do			Savannah.
Shearwater	4	40	0	8	0	6	0	do		4	Montgomery.
Sioux	1	24	0	5	0	1	10	do		1	Kansas City.
Sisters, The	.5	25	0	4	4	3	0	do			Cincinnati (1st).
Sirius	5	32	0	8	0	3	0	do		1	Jacksonville.
Skycoak	41	60	0	15	1	7	0	do	2	1	Norfolk.
Sny	18.9	52	6	13	0	4	0	do		2	Rock Island.
Spray	12.5	45	6	11	0	7	6	do			Savannah.
Spry	2	18	6	5	4	3	8	do		1	Wilmington, N. C.
Stadia	5	30	3	6	5	2	9	do			New Orleans.
Starvation	1	22	6	6	6	2	6	do		1	Norfolk.
Stewart	1.5	28	0	6	6	2	6	Steel			St. Louis.
Sub Rosa		14	0	4	0	2	3	Wood			Montgomery.
Suisun	73	85	9	15	6	9	6	do	3	2	San Francisco (1st).
Swallow No. 2		18	0	3	4	1	4	do			Rock Island.
Tarascon	1.1	26	5	6	1	2	6	Steel		1	Louisville.
Talihana	1.5	21	0	5	0	1	6	Wood		1	Little Rock.
Tamerlane		30	0	5	6	3	0	do		1	Kansas City.
Tee Ree	2	31	0	6	6	2	8	do	1		Charleston.
Terrapin	1	23	7	5	4	2	4	do		1	Kansas City.
Texas	4.9	31	5	8	0	6	3	do		1	Dallas.
Tiskelwah	.8	22	0	5	6	2	7	Steel			Wheeling.
Toco		28	0	6	4	2	8	do		1	Chattanooga.
Tocoi	.25	16	10	4	1	1	9	do			Jacksonville.
Toltec	4	33	0	7	4	2	0	Wood		1	Little Rock.
Tomahawk		22	6	5	6	2	4	do		1	Kansas City.
Trenton	4.5	28	0	8	0	3	8	do			Philadephia.
Trimbelle	1.5	35	0	5	10	3	6	do		1	Rock Island.
Tumwater	3	32	0	7	0	3	6	do		1	Portland, Oreg. (1st).
Uchee	1.5	24	0	5	11	2	4	Steel			Savannah.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

GASOLINE LAUNCHES (SCREW)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
Vamos	5	31 0	7 0	2 2	Wood			Rock Island.
Vermilion	15	45 6	13 5.5	5 9	...do		1	New Orleans.
Vernon	1	15 0	4 0	2 3	...do			Montgomery.
Victoria	3	27 0	7 0	3 4	...do	1	1	Galveston.
Vigilant	22	63 3	12 0	7 6	...do	1	1	Portland, Oreg. (2d)
Viola		26 0	5 0	1 6	...do			Rock Island.
Violetta	8	31 0	11 4	4 4	...do		1	Jacksonville.
Viper		28 0	4 6	2 6	...do			Rock Island.
"W"		16 4	4 8	0 10	...do			New York (1st).
Wah-ta-wah	36	80 0	15 0	5 2	...do	2	2	New York (1st).
Wakenda	1	24 0	5 0	1 10	...do		1	Kansas City.
Waumandee	1.5	30 6	5 9	3 9	...do			Rock Island.
Zumbro		35 0	6 0	2 6	...do		1	Wilmington, N. C.
No. 1		14 0	4 0	2 6	...do			Wilmington, Del.
No. 1	2	17 0	5 5	2 4	...do			Mobile.
No. 1, M. R. C	.8	19 6	4 10	1 3	...do		1	St. Louis (M. R. C.)
No. 2	2	20 0	5 3	3 0	Steel		1	Chattanooga.
No. 2, M. R. C	.8	19 6	4 10	1 3	Wood			St. Louis (M. R. C.)
No. 3	3	22 0	6 3	3 2	...do		1	Chattanooga.
No. 3, U. S. L. S	2.6	22 3	6 3	3 2	...do			Detroit (Lake Survey).
No. 4	6	23 0	6 6	3 6	...do		1	Chattanooga.
No. 4, M. R. C	.8	19 6	4 10	1 3	...do		1	St. Louis (M. R. C.)
No. 4, U. S. L. S	10	38 6	11 0	4 2	...do			Detroit (Lake Survey).
No. 5, U. S. L. S	10	36 1	9 0	6 6	...do			Do.
No. 6	4	23 0	6 0	4 6	...do		1	Chattanooga.
No. 6, U. S. L. S	10	36 0	9 0	4 0	...do			Detroit (Lake Survey).
No. 7	3	27 6	4 0	3 8	...do		1	Chattanooga.
No. 8		23 9	4 10	3 7	...do			Do.
No. 8, U. S. L. S	2.4	23 3	4 6	3 3	...do			Detroit (Lake Survey).
No. 33, U. S. E. D., Wheeling.	.5	22 0	5 10	1 10	...do			Wheeling, W. Va.
No. 34, U. S. E. D., Wheeling.	.7	22 0	5 10	1 10	...do			Do.
No. 36, U. S. E. D., Wheeling.	.7	22 0	5 10	1 10	...do			Do.
Wild Horse	1	24 0	5 0	1 10	...do		1	Kansas City.

GASOLINE TOWBOATS (PADDLE).

Name, number, or letter.	Displacement.	Length.	Breadth.	Depth.	Material.	Officers.	Men.	District.
Alto	30	76 0	16 0	1 6	Wood		3	Wheeling.
Comet	21	69 0	16 0	2 4	...do			Cincinnati (1st).
Coosa	123	95 0	18 0	4 9	...do		6	Montgomery.
Gasconade	13	59 2	12 6	2 6	...do		3	Kansas City.
Glenville	30	53 6	9 0	3 0	Steel			Wheeling.
Katherine	55	86 4	22 0	3 0	Wood	2	14	Kansas City.
Kettle Falls	18	60 7	11 6	3 7	...do			Seattle.
Leona	10	46 0	10 0	3 0	...do		2	Rock Island.
Richland	79	103 6	20 6	4 7	...do			Charleston.
Sylph	38	84 6	16 5	2 9	...do	1	2	Mobile.
Ulkanush	40	78 6	16 6	3 6	...do		3	Do.
White Oak	96	115 0	23 6	3 6	...do		7	Nashville.
No. 1	52	96 0	15 0	2 8	...do		2	Do.

QUARTER BOATS.

Name, number, or letter.	Displacement.	Length.	Breadth.	Depth.	Material.	Officers.	Men.	District.
A	34	45 0	24 0	5 0	Wood			Mobile.
B	75	60 4	20 0	6 0	...do			Charleston.
B	33	60 0	20 0	3 4	...do	3	21	Mobile.
Baton Rouge	198	140 0	30 4	4 0	...do	10	180	New Orleans (4th M. R. C.).
Bayou Goula	198	140 0	30 4	4 0	...do	10	180	Do.
Bayou Sara	198	140 0	30 4	4 0	...do	10	180	Do.
Beaufort	15	50 0	18 3	2 8	...do		11	Wilmington, N. C.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

QUARTER BOATS—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
C	34	68 8	18 0	4 0	Wood			Charleston.
C	48	100 0	20 0	4 0	...do	1	41	Kansas City.
Chester	90	60 0	25 0	5 8	...do	3	15	Philadelphia.
Choupique	75	67 8	28 6	4 3	...do			New Orleans.
Coinjock	72.70	80 0	22 0	4 3	...do			Norfolk, Va.
D	83	70 0	25 0	5 9	...do			Mobile.
Donaldsonville	187	100 0	30 0	4 0	...do	12	30	New Orleans (4th M. R. C.).
Hay Lake	106	70 0	22 0	4 4	...do			Detroit.
Intracoastal	57.9	65 6	22 6	4 5	...do			New Orleans.
Lacassine	9.4	30 0	15 0	3 5	...do			Do.
Lake Borgne	68	80 0	22 0	4 4	...do	3	7	New Orleans (4th M. R. C.).
Margaret	30	100 0	26 0	4 3	...do			Chicago.
N	65	75 6	22 6	5 2	...do		21	Mobile.
Natchez	193	140 0	30 4	4 0	...do	10	180	New Orleans (4th M. R. C.).
New Orleans	237	166 0	30 0	4 3	...do	10	180	Do.
O	65	75 6	22 6	5 2	...do		20	Mobile.
Observer	25	50 0	20 0	5 0	...do		1	Philadelphia.
Olga	68	80 0	22 0	4 4	...do	4	8	New Orleans (4th M. R. C.).
Port Hudson	68	80 0	22 0	4 4	...do	2	6	Do.
Pungo	72.7	80 0	22 0	4 3	...do	5	21	Norfolk.
Q	44	70 0	25 0	5 9	...do	1	20	Mobile.
St. Joseph	198	140 0	30 4	4 0	...do	10	180	New Orleans (4th M. R. C.).
Thronateeska	96	75 0	26 0	4 7	...do		24	Montgomery.
Torras	68	80 0	22 0	4 4	...do	2	6	New Orleans (4th M. R. C.).
Vidalia	187	100 0	30 0	4 0	...do	12	30	Do.
Wabash No. 3	53	102 4	22 0	3 0	...do		28	St. Louis (M. R. C.).
Wigwam	49	70 0	22 0	3 3	...do			St. Paul.
Z	72	90 0	20 0	4 0	...do	4	36	Kansas City.
No. 1	28	65 0	14 0	2 6	...do		10	Nashville.
No. 1	20	60 0	16 0	3 0	...do		4	Chattanooga.
No. 1	81	60 8	23 7	7 6	...do			Galveston.
No. 1	110	100 0	20 0	5 0	...do	10	52	Kansas City.
No. 1	23	50 0	20 0	3 7	...do		27	Montgomery.
No. 1	27	51 6	11 0	4 0	...do			Savannah.
No. 1, H. B	39.9	45 0	15 0	4 0	...do			Jacksonville.
No. 1, M. R	44	85 0	22 0	3 6	...do			Pittsburgh.
No. 1	120	90 0	26 0	4 0	...do		11	Portland, Oreg. (2d).
No. 1	115	135 0	26 0	3 6	...do	17	110	St. Louis.
No. 1, Neches River	27	60 0	16 0	4 0	...do		10	Dallas.
No. 2	110	100 0	20 0	5 0	...do	10	52	Kansas City.
No. 2	130	135 0	30 0	3 11	...do			Memphis (M. R. C. 1st, 2d).
No. 2	25	70 0	18 3	3 6	...do		18	Milwaukee.
No. 2	23	50 0	20 0	3 7	...do		27	Montgomery.
No. 2	30	65 0	14 0	2 6	...do		10	Nashville.
No. 2	26	56 0	20 0	3 6	...do		10	Portland, Oreg. (2d).
No. 2, Cypress Bayou	35	66 6	22 0	3 6	...do		40	Dallas.
No. 2, Ohio	88	110 0	22 0	3 6	...do			Louisville.
No. 3	24	65 0	16 0	3 0	...do		2	Chattanooga.
No. 3	11	50 0	16 0	3 0	...do			Chicago.
No. 3	110	100 0	20 0	5 0	...do	10	52	Kansas City.
No. 3	26	60 0	16 0	2 0	...do		8	Montgomery.
No. 3	16	60 0	14 0	2 6	...do		12	Nashville.
No. 3	30	56 0	15 4	3 0	...do			Savannah.
No 3	34	68 0	18 0	3 0	Steel	1	20	Vicksburg.
No. 3	130	135 0	30 0	3 11	Wood	17	116	Memphis (M. R. C 1st, 2d).
No. 3, Hudson River	17	40 5	15 6	2 4	...do	3	9	New York (1st)
No. 3, Ohio	88	110 0	22 0	3 6	...do			Louisville.
No. 3, Red River	25	62 0	18 0	2 10	...do	1	18	Dallas.
No. 4	130	135 0	32 0	3 11	...do			St. Louis.
No. 4	16	53 0	16 0	2 9	...do		11	Wilmington N. C.
No. 4	48	70 0	21 6	3 0	...do		50	Montgomery
No. 4	27.7	61 0	18 0	3 2	...do			Nashville.
No. 4	72	90 0	20 0	5 0	...do	1	41	Kansas City.
No. 4	15	51 0	13 0	4 0	...do			Savannah.
No. 4, Ohio	88	110 0	22 0	3 6	...do			Louisville.
No. 4, Trinity River	35	66 6	22 0	3 6	...do		40	Dallas.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

QUARTER BOATS—Continued.

Name, number, or letter.	Displacement.	Dimensions.						Material.	Complement.		District.
		Length.		Breadth.		Depth.			Officers.	Men.	
	Tons.	*Ft.*	*in.*	*Ft.*	*in.*	*Ft.*	*in.*				
No. 5	25	64	0	16	0	3	0	Wood		15	Chattanooga.
No. 5	130	135	0	30	0	3	11	...do			Memphis (M. R. C. 1st, 2d).
No. 5	40	81	4	27	9	5	2	...do			Montgomery
No. 5	20	41	0	16	0	3	10	...do			Savannah.
No. 5	72	90	0	20	0	5	0	...do	1	41	Kansas City
No. 5	34	68	0	18	0	3	0	Steel	1	20	Vicksburg.
No. 5, Ohio	169	124	6	25	0	4	2	Wood			Louisville.
No. 6	20	65	0	16	0	3	0	...do		24	Chattanooga.
No. 6	84	100	0	20	0	5	0	...do	10	53	Kansas City.
No. 6	130	135	0	30	0	3	11	...do			Memphis (M. R. C. 1st, 2d).
No. 6	18	61	0	21	6	5	0	...do			Montgomery.
No. 6	42	60	0	20	0	6	0	...do			Savannah.
No. 7	44	106	0	21	0	3	0	...do		6	Chattanooga.
No. 7	81	100	0	20	0	5	0	...do	10	58	Kansas City, Mo.
No. 7	130	135	0	30	0	8	0	...do	17	116	St. Louis.
No. 8	27	67	0	16	0	3	0	...do		4	Chattanooga.
No. 8	84	100	0	20	0	5	0	...do	10	58	Kansas City, Mo.
No. 8	130	135	0	30	0	3	11	...do	17	116	St. Louis.
No. 9	56	104	0	20	0	3	6	...do		15	Chattanooga.
No. 9	50	100	0	20	0	4	0	...do	1	41	Kansas City, Mo.
No. 9	130	135	0	30	0	3	11	...do	17	116	St. Louis.
No. 9	34	68	0	18	0	3	0	Steel	1	20	Vicksburg.
No. 10	45	105	0	21	0	3	9	Wood		36	Chattanooga.
No. 10	22	75	0	14	0	1	9	...do			Cincinnati (2d).
No. 10	130	135	0	30	0	3	11	...do	17	116	St. Louis.
No. 10	34	68	0	18	0	3	0	Steel	1	20	Vicksburg.
No. 11	56	100	0	20	0	4	0	Wood		3	Chattanooga.
No. 11	40	90	0	18	0	3	6	...do			Cincinnati (2d).
No. 11	125	135	0	31	0	8	0	...do		128	Memphis (M. R. C. 1st, 2d).
No. 11	46	75	0	20	0	3	0	...do		30	Rock Island.
No. 11	34	68	0	18	0	3	0	...do	1	20	Vicksburg.
No. 16	60	68	0	26	0	5	0	...do			Montgomery.
No. 17	52	70	0	24	0	3	0	...do		84	Rock Island.
No. 20	93	100	0	24	0	4	0	...do			Chattanooga.
No. 21	93	100	0	24	0	4	0	...do			Do.
No. 22	95	100	0	24	0	4	6	...do			Do.
No. 25	125	135	0	31	0	8	0	...do	3	60	Memphis (M. R. C. 1st, 2d).
No. 25	120	80	0	29	0	5	0	...do		28	Montgomery.
No. 27	82	100	4	26	5¼	4	0	...do			Memphis (M. R. C. 1st, 2d).
No. 28	30	65	0	20	0	3	9	...do			Wheeling.
No. 29, Amelia	43	90	6	18	6	3	0	...do	11	2	Memphis (M. R. C. 1st, 2d).
No. 41, Hudson River.	150	86	9	26	4	8	9	...do			New York (1st).
No. 41, Hudson River.	80	62	0	22	0	4	3	...do			Do.
No. 44	40	50	0	22	0	3	6	Steel			Cincinnati (2d).
No. 47	46	75	0	20	0	3	0	Wood		35	Rock Island.
No. 65	20	40	0	16	0	2	0	...do		6	Do.
No. 71	46	75	0	20	0	3	6	...do		6	Do.
No. 75	46	75	0	20	0	3	6	...do		35	Do.
No. 91	15	50	0	12	0	3	0	...do		12	Do.
No. 92	40	81	0	16	0	3	0	...do		20	Do.
No. 118	43	70	0	20	0	3	0	...do		48	Do.
No. 120	14	40	0	14	0	2	0	...do		3	Do.
No. 121	26	52	0	16	0	2	6	...do		12	Do.
No. 122	26	52	0	16	0	2	6	...do		12	Do.
No. 123	26	52	0	16	0	2	6	...do		12	Do.
No. 131	186	131	0	30	0	5	0	...do		131	Vicksburg (M. R. C. 3d).
No. 155	107	120	0	28	0	6	0	...do	8	90	Do.
No. 156	107	120	0	28	0	6	0	...do		12	Do.
No. 157	107	120	0	28	0	6	0	...do	8	94	Do.
No. 159	107	120	0	28	0	6	0	...do			Do.
No. 183	62	100	0	20	0	3	0	...do		56	Rock Island.
No. 184	33	60	0	18	0	3	0	...do		18	Do.
No. 202	43	70	0	20	0	3	0	...do		35	Do.

TABLE 2.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department*—Continued.

QUARTER BOATS—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	*Ft. in.*	*Ft. in.*	*Ft. in.*				
No. 206	130	120 0	30 0	6 0	Wood		120	Memphis (M. R. C. 1st, 2d).
No. 221	130	120 0	30 0	6 0	...do		120	Do.
No. 231	62	100 0	20 0	4 3	...do		56	Rock Island.
No. 237	46	68 0	22 0	3 0	...do		24	Do.
No. 262	45	66 0	22 0	3 0	...do		18	Do.
No. 301	46	75 0	20 0	4 0	...do		35	Do.
No. 342	50	80 0	20 0	3 0	...do		20	Do.
No. 343	43	70 0	20 0	3 0	...do		46	Do.
No. 344	43	70 0	20 0	3 0	...do		30	Do.
No. 345	43	70 0	20 0	3 0	...do		30	Do.
No. 346	50	80 0	20 0	3 0	...do		20	Do.
No. 347	50	80 0	20 0	3 0	...do		20	Do.
No. 348	50	80 0	20 0	3 0	...do		20	Do.
No. 367	50	78 0	26 0	3 0	...do		60	Do.
No. 411	60	76 0	26 0	4 0	...do		50	Do.
No. 412	51	82 0	20 0	3 0	...do		46	Do.
No. 414	43	70 0	20 0	3 0	...do		30	Do.
No. 492	50	71 0	18 0	3 6	...do		30	Do.
No 501	100	100 0	20 0	5 0	...do			Kansas City
No. 504	40	75 0	20 0	3 0	...do		30	Rock Island.
No. 505	40	75 0	20 0	3 0	...do		30	Do.
No. 512	42	80 0	18 0	3 6	...do		20	Do.
No. 513	42	80 0	18 0	3 6	...do		20	Do.
No. 514	42	80 0	18 0	3 6	...do		20	Do.
No. .0601	30	68 0	18 0	4 0	...do	5	14	Memphis (M. R. C. 1st, 2d).
No. 1010	177	135 0	34 0	5 0	...do	8	127	Vicksburg (M. R. C. 3d).
No. 1020	156	140 0	30 0	4 0	...do		156	Memphis (M. R. C. 1st, 2d).
No. 1021	156	140 0	30 0	4 0	...do		156	Do.
No. 1107	177	140 0	34 0	5 0	...do		129	Vicksburg (M. R. C. 3d).
No. 1108	177	140 0	34 0	5 0	...do		129	Do.
No. 1201	177	140 0	34 0	5 0	...do		129	Do.
No. 1202	177	140 0	34 0	5 0	...do		129	Do.
No. 1301	77	100 0	26 0	4 0	...do	3	33	Memphis (M. R. C. 1st, 2d).
No. 1307	177	140 0	34 0	5 0	...do	10	144	Vicksburg (M. R. C. 3d).
No. 1308	177	140 0	34 0	5 0	...do	10	144	Do.
No. 1402	190	160 0	36 6	4 0	...do	2	255	Memphis (M. R. C. 1st, 2d).
No. 1513	78	86 0	22 0	4 9	...do			Vicksburg (M. R. C. 3d).
No. 1607	41	62 6	18 0	3 6	...do			Do.

CONCRETE-MIXING PLANTS.

No. 1	208	80 0	36 0	6 0	Wood			Cincinnati (1st).
No. 1	146	90 0	30 0	6 4	...do		13	Portland, Oreg. (2d).
No. 1, Paver	290	124 0	30 0	7 7	...do	2	5	New Orleans (4th M. R. C.).
No. 14, Material scow		70 0	22 0	6 5	...do			Buffalo, N. Y.
No. 63, U. S. E. D., Wheeling.	480	90 0	40 0	7 1	...do		13	Wheeling.
No. 1208	400	120 11	45 2	7 0	Steel	1	11	Memphis (M. R. C. 1st, 2d).
No. 1509	200	120 0	30 0	7 0	Wood		12	Vicksburg (M. R. C. 3d).
No. 072	200	120 0	30 0	6 0	...do		12	Do.
No. 1709	200	120 0	30 0	7 0	...do	3	6	Do.
No. 1711	200	120 0	30 0	7 0	...do	3	6	Do.
No. 1712	222	130 0	37 6	7 0	...do	2	6	Do.
No. 1713	340	160 0	45 0	10 0	...do	2	6	Do.

TABLE 3.

LIST OF FLOATING PLANT BY DISTRICTS.

TABLE 3.—*Statement of floating plant owned by the United States and*

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
BALTIMORE, MD.										
Sentinel	Tugboat, screw	170	95	0	20	0	10	6	1897	Baltimore, Md
Pathfinder	Gasoline boat, screw	10	38	0	9	6	6	5	1909	Fort Howard, Md
BOSTON, MASS.										
Col. Harwood [1]	Tug and survey boat	107	80	0	17	8	9	6	1898	South Portland, Me.
Executive	Steam lighter	236	91	0	20	0	10	0	1901	Essex, Mass
Plebe	Gasoline launch (screw).	19	56	0	9	0	5	0	[3] 1899	Boston, Mass
No. 1	Survey boat (scow)	18	55	0	12	0	3	2	1910	do
No. 2	do	18	55	0	12	0	3	2	1910	do
No. 3	do	18	55	0	12	0	3	2	1911	Chelsea, Mass
No. 4	do	18	55	0	12	0	3	2	1911	do
No. 1	Float, boring	8	30	0	12	6	3	3	1913	East Boston, Mass
No. 2	do	8	30	0	12	6	3	3	1913	do
BUFFALO, N. Y.										
Scajaquada	Gasoline cruiser	65	82	9	15	6	9	6	1914	Muskegon, Mich
Thomas Lincoln Casey.[5]	Steam tug	90	70	0	16	0	8	0	1898	Toledo, Ohio
Gwendolen	Steam launch	8	31	6	8	0	4	6	1900	Erie, Pa
Black Rock	Gasoline launch	1	25	0	7	3	4	0	1911	Buffalo, N. Y
Ontario	do	1	27	0	6	3	4	0	1904	Oswego, N. Y
Sodus	Dipper Dredge	375	100	0	35	0	9	8	1912	do
No. 1	Derrick scow	85	74	0	26	0	5	0	1892	do
No. 2	do	106	76	0	26	0	6	3	1905	do
No. 3	Material scow		68	0	20	0	5	6	1905	do
No. 4	do		68	0	20	0	5	6	1905	do
No. 5	do		42	0	12	6	3	11	1908	do
No. 6	do		68	0	20	0	5	6	1907	do
No. 7	Dump scow		75	0	20	0	6	6	1907	do
No. 8	do		75	0	20	0	6	6	1907	do
No. 13	Stone scow	150	100	0	32	0	9	5	1909	do
No. 14	Material scow		70	0	22	0	6	5	1911	do
No. 15	Dump scow		100	0	24	0	8	2	1912	do
No. 16	do		100	0	24	0	8	2	1912	do
No. 17	Sounding raft		60	0	20	0	2	0	1915	Buffalo, N. Y
CHARLESTON, S. C.										
Sumter	Seagoing hopper dredge.	1,706	200	0	41	0	21	0	1904	Petersburg, Va
Winyah Bay	do	831	141	0	31	6	13	0	1898	Wilmington, Del
Congaree	Hydraulic pipe-line dredge.	430	101	0	32	0	6	0	1914	Charleston, S. C
Cheraw	Dipper dredge	620	155	0	28	0	8	0	1905	Wilmington, Del
Pedee	Snagboat	317	131	8	27	0	5	3	1912–1913	Charleston, S. C
Wateree	do	317	131	8	27	0	5	3	1912–1913	do
No. 3[11]	Derrick boat	95	60	0	20	0	6	0	1911	Georgetown, S. C
No. 1, C. R.[10]	Maneuver boat	57	60	0	22	0	3	5	1911–1912	Columbia, S. C

---

[1] Formerly Mina and Lizzie.

[2] After purchase this boat was altered and repaired to such extent that its original cost in its present state was about $14,000.

[3] Rebuilt by United States, 1904.

[4] Dismantled and stored at Fort Standish, Boston Harbor, Mass.

employed in the Engineer Department at large on Dec. 31, 1917.

BALTIMORE, MD.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1897	Baltimore, Md..	Steel..	$24,497.00	$13,500.00	Good..	$1,462.90	Harbor at Baltimore, Md.
......	Built by United States.	Wood.	1,360.00	650.00	...do...	....	Do.

BOSTON, MASS.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
1905	Portland, Me....	Wood.	[3] $7,500.00	$4,500.00	Good..	$4,371.56	Boston Harbor, Mass.
......	....	...do...	19,450.00	6,000.00	...do...	5,229.25	Gun and mortar batteries.
......	....	...do...	5,980.00	600.00	...do...	127.76	Boston Harbor one-half, Plymouth Harbor and Mystic River one-quarter each.
......	....	...do...	1,349.00	500.00	...do...	....	Boston Harbor, Mass.
......	....	...do...	1,349.00	500.00	...do...	....	Do.
......	....	...do...	1,237.50	500.00	...do...	....	Do.
......	....	...do...	1,237.50	500.00	...do...	....	Do.
......	....	...do...	2,575.00	650.00	...do[4]..	....	Merrimack River, Mass.
......	....	...do...	2,575.00	650.00	...do[4]..	....	Do.

BUFFALO, N. Y.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
......	....	Wood.	$30,000.00	$26,000.00	Good..	$646.91	Erie Harbor, Pa., Black Rock, Oswego, and Ogdensburg Harbors, N. Y.
......	....	Steel..	11,970.00	7,000.00	...do...	103.50	Buffalo Harbor, N. Y.
......	....	Wood.	1,800.00	1,000.00	...do...	78.73	Erie Harbor, Pa.
1911	Buffalo, N. Y...	...do...	600.00	300.00	...do...	17.66	Black Rock Harbor, N. Y.
......	....	...do...	525.00	[6] 625.00	...do...	22.19	Harbors on Lake Ontario.
......	....	...do...	36,000.00	36,000.00	...do...	1,659.45	Do.
......	....	...do...	2,900.00	1,400.00	...do...	97.16	Charlotte Harbor, N. Y.
......	....	...do...	5,000.00	2,400.00	Fair...	3,001.13	Little Sodus Harbor, N. Y.
......	....	...do...	1,250.00	850.00	...do...	....	Charlotte Harbor, N. Y.
......	....	...do...	1,250.00	850.00	...do...	....	Do.
......	....	...do...	450.00	450.00	Good..	....	Oswego Harbor, N. Y.
......	....	...do...	1,500.00	950.00	...do...	....	Little Sodus Harbor, N. Y.
......	....	...do...	3,100.00	100.00	Poor..	....	Harbors on Lake Ontario.
......	....	...do...	3,100.00	100.00	...do...	....	Do.
......	....	...do...	6,500.00	4,500.00	Good..	....	Do.
......	....	...do...	2,273.25	[7] 5,000.00	...do...	102.58	Charlotte Harbor, N. Y.
......	....	...do...	5,621.37	5,000.00	...do...	....	Harbors on Lake Ontario.
......	....	...do...	5,521.37	5,000.00	...do...	....	Do.
......	....	...do...	899.93	750.00	...do...	....	Buffalo and Black Rock Harbors, N. Y.

CHARLESTON, S. C.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
......	(8)	Wood.	$191,560.00	$67,500.00	Good .	$15,515.09	Harbor at Charleston, S. C.
......	(8)	...do...	73,800.00	66,420.00	...do...	7,866.96	Winyah Bay, S. C.
......	(9)	Steel..	30,200.00	45,000.00	...do...	2,197.37	Santee, Wateree, Congaree and Great Pedee Rivers, S. C.
......	(8)	...do...	45,500.00	15,000.00	Poor..	....	Great Pedee River, S. C.
......	(10)..............	...do...	29,285.45	26,356.70	Good .	210.35	Do.
......	(10)..............	...do...	29,375.12	26,437.61	...do...	1,915.83	Santee, Wateree, and Congaree Rivers, S. C.
......	(10)..............	Wood.	4,200.00	1,350.00	Poor..	....	Great Peedee River, S. C.
......	....	...do...	5,409.00	3,600.00	Good..	....	Operation and care of canals, etc., for Congaree River, S. C.

---

[5] Formerly Gen. John M. Wilson.
[6] With engine, etc.
[7] With mixing plant and appliances.
[8] Built under contract.
[9] Rebuilt under contract.
[10] Built by United States.
[11] Formerly derrick boat No. 1.

TABLE 3.—*Statement of floating plant owned by the United States and*

CHARLESTON, S. C.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Dawho	Gasoline launch (screw).	20	60	0	13	0	8	0	1909	City Island, N. Y.
Louise	....do	13	41	0	11	0	4	8	1903	Mount Pleasant, S.C
Tee-Ree	....do	2	31	0	6	6	2	4	1907	....do
Granby	....do	1	16	0	4	0	1	3	(2)	(2)
Richland [3]	Gasoline towboat (paddle).	79	103	6	20	6	4	7	1912-1913	Columbia, S. C.
B [4]	Quarter boat	75	60	4	20	0	6	0	1908	Charleston, S. C.
C [5]	....do	34	68	8	18	0	4	0	1914-1915	Columbia, S. C.
No. 1	115 cubic yard bottom-dump scow.	112	69	3	21	5	6	6	(2)	(2)
No. 2	130 cubic yard bottom-dump scow.	125	71	4	22	2	7	7½	(2)	(2)
No. 1	100-ton decked lighter	100	72	6	20	0	6	0	1907	Charleston, S. C.
No. 2	75-ton decked lighter	75	60	6	19	6	6	0	1903	....do
No. 3	18-ton decked lighter	18	41	0	12	0	4	0	1903	Georgetown, S. C.
No. 4 [6]	70-ton decked lighter	70	70	0	22	0	4	0	1908	Columbia, S. C.
No. 5 [7]	30-ton decked lighter	30	40	0	14	0	3	0	1908	....do
No. 6	2-ton decked lighter	2	20	0	5	0	1	2	1906	....do
No. 7	6-ton open-boring flat	6	20	0	10	0	2	0	1915	Charleston, S. C.
No. 8	60-ton decked lighter	12	55	0	16	0	4	0	1916	Columbia, S. C.
No. 9	3.5-ton decked lighter	1.3	20	0	6	6	1	10	1916	....do
No. 10 [8]	110-ton decked lighter	110	80	0	28	0	4	0	1907	....do
No. 11 [9]	149-ton decked lighter	149	70	0	22	0	6	10	1911	Georgetown, S. C.

CHATTANOOGA, TENN.

Name or number.	Type.	Displacement in long tons.	Length.		Beam.		Depth.		When.	Where.
Chickamauga	Stern-wheel towboat	112	115	0	22	5	3	0	1915	Muscle Shoals Canal.
Chilhowee	....do	104	113	0	20	0	3	6	1908	
Colbert	....do	185	139	6	28	3	4	3	1891	
Col. W. R. King	....do	87	78	0	15	8	3	6	1896	Muscle Shoals Canal.
Lookout	....do	180	137	8	25	7	4	4	1896	
McPherson	....do	137	115	0	23	6	3	6		
Ocoee	....do	120	115	0	22	5	3	0	1914	Muscle Shoals Canal.
Clinch	Gasoline launch	9.5	35	0	8	0	3	9	1912	Colbert Shoals Canal.
No. 2	....do	2	21	7	5	7	2	9		
No. 3	....do	3	22	8	6	5	3	3	1908	Knoxville, Tenn.
No. 4	....do	6	23	0	6	6	3	3	1908	....do
No. 6	....do	4	28	4	5	0	2	6	1909	Muscle Shoals Canal.
No. 7	....do	1.5	22	0	5	0	2	9	1908	....do
No. 8	....do	1.9	23	9	4	10	2	5		
Toco	....do		28	6	6	4	2	10	1917	Sale Creek Shoals.
Alabama	Dredge (wet conveyer)	244	96	6	38	0	6	4	1891	Chattanooga, Tenn.
Kentucky	Dipper dredge	326	109	0	34	0	6	10	1900	Paducah, Ky.
Kwasind	....do	187	80	0	28	0	6	6	1899	Knoxville, Tenn.
Nolichucky	....do	211	97	11	30	0	6	9	1913	Muscle Shoals Canal.
Tellico	....do	170	85	8	30	0	7	0	1912	Knoxville, Tenn.
Tennessee	....do	390	109	2	34	0	6	10	1910	Muscle Shoals Canal.
Tuscumbia	....do	375	109	0	34	0	6	10	1912	....do
Watauga	....do	400	105	0	34	0	7	10	1912	....do
Pump boat 1	10-inch suction	113	90	0	24	0	4	4	1910	....do
No. 1	Quarter boat	26	60	0	16	0	3	2	1893	Kingston, Tenn.
No. 3	....do	13.6	66	3	16	4	3	6	1888	Chattanooga, Tenn.
No. 5	....do	33.6	64	0	20	0	3	3	1902	Knoxville, Tenn.
No. 6	....do	22	64	0	16	0	3	2	1902	....do
No. 7	....do	65	106	0	21	0	3	0	1902	....do
No. 8	....do	24	68	8	16	0	3	2	1893	Chattanooga, Tenn.

[1] Built under contract.
[2] Unknown.
[3] Built by United States.
[4] Formerly No. 3.
[5] Formerly No. 1.
[6] Formerly D.
[7] Formerly E.
[8] Formerly derrick boat No. 1.
[9] Formerly listed as bucket dredge.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

CHARLESTON, S. C.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1910	Rochester, N. Y.	Wood.	$8,000.00	$6,300.00	Good..	$651.71	All works in district.
......	(1)	...do...	3,500.00	1,800.00	...do...	99.97	Do.
1914	Charleston, S. C.	...do...	315.00	193.50	...do...	290.47	Santee, Wateree, and Congaree Rivers, S. C.
......	(2)	...do...	125.00	67.50	Fair...	....	Do.
......	....	...do...	10,277.26	7,470.00	Good..	957.69	Congaree River, S. C., and operation and care of canals, etc.
......	....	...do...	800.00	100.00	Poor..	....	Waccamaw River, N. C., and S. C.
......	....	...do...	1,554.86	1,125.00	Good..	....	Santee, Wateree, and Congaree Rivers, S. C.
1913	Jacksonville, Fla	...do...	2,586.94	1,350.00	Fair...	....	Winyah Bay, S. C.
1913	.......do........	...do...	2,259.90	1,350.00	...do...	....	Do.
......	....	...do...	1,947.00	450.00	...do...	....	Fortification works.
......	....	...do...	800.00	150.00	...do...	....	Do.
......	....	...do...	200.00	50.00	Poor..	....	Do.
......	....	...do...	900.00	350.00	Fair...	....	Do.
......	....	...do...	400.00	125.00	...do...	....	Do.
......	....	...do...	125.00	75.00	...do...	....	Congaree River, S. C.
......	....	...do...	60.00	50.00	Good..	....	Ashley River, S. C.
......	....	...do...	60.00	50.00	...do...	....	Congaree River, S. C., and operation and care of canals, etc.
......	....	...do...	500.00	450.00	...do...	....	Santee, Wateree, and Congaree Rivers, S. C.
......	(3)	...do...	1,112.00	450.00	...do...	....	Congaree River, S. C.
......	(3)	...do...	1,650.00	500.00	...do...	....	Santee, Wateree, and Congaree Rivers, S. C.

CHATTANOOGA, TENN.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
......	....	Wood.	$19,955.38	$11,847.00	Poor..	$633.79	Tennessee River.
1908	Jeffersonville, Ind.	...do...	[10] 9,616.92	5,057.00	Fair...	1,267.85	Do.
1891	.....do..........	...do...	[10] 9,500.00	13,480.00	Good..	681.79	Do.
......	....	...do...	[10] 1,300.00	995.00	Poor..	1,402.67	Do.
1896	Jeffersonville, Ind.	...do...	[10] 9,000.00	10,689.00	Good..	6,997.66	Do.
1888	Nashville, Tenn.	...do...	[10] 3,300.00	5,363.00	Fair...	1,183.99	Do.
......	....	...do...	18,453.00	11,036.00	Good..	298.53	Do.
......	....	...do...	1,662.00	550.00	Poor..	44.29	Colbert Shoals Canal.
1897	Detroit, Mich...	Steel..	525.00	401.00	...do...	140.39	Tennessee River.
......	....	Wood.	738.35	150.00	Fair...	24.47	Do.
......	....	...do...	738.35	....	Worthless.	64.61	Do.
......	....	...do...	833.76	750.00	Fair...	842.64	Do.
......	....	...do...	805.57	379.00	Good..	9.05	Do.
1914	Riverton, Ala...	...do...	200.00	100.00	Poor..	....	Colbert Shoals Canal.
......	....	Steel..	1,466.73	1,392.00	Good..	22.50	Tennessee River.
......	....	Wood.	[10] 22,500.00	15,861.00	...do...	333.04	Muscle Shoals Canal.
......	....	...do...	[10] 34,500.00	12,296.00	Fair...	1,923.00	Tennessee River.
......	....	...do...	[10] 11,000.00	18,687.00	...do...	6,554.78	Do.
......	....	...do...	27,011.65	15,592.00	Poor..	3,516.26	Do.
......	....	...do...	17,978.00	7,805.00	Fair...	9,084.38	Do.
......	....	...do...	37,513.00	18,557.00	...do...	8,086.36	Do.
......	....	...do...	43,870.92	16,098.00	...do...	1,894.99	Do.
......	....	...do...	49,327.16	2,527 00	...do...	5,114.49	Do.
......	....	...do...	7,000.00	2,750.00	...do...	956.91	Do.
......	....	...do...	[11] 1,000.00	720.00	...do...	146.12	Do.
......	....	...do...	[11] 700.00	1,576.00	Good..	9.20	Do.
......	....	...do...	935.00	254.00	Fair...	252.02	Do.
......	....	...do...	935.00	410.00	...do...	....	Do.
......	....	...do...	1,800.00	838.00	Good..	209.74	Do.
......	....	...do...	850.00	517.00	Poor..	135.88	Do.

[10] Rebuilt by United States. Towboat Hiwassee and White Oak and dredge Tishomingo transferred to Nashville district during year.

[11] Rebuilt by United States. Quarter boat No. 2 is now being reported as supply boat No. 2. Derrick boats No. 8 and No. 14 transferred to Nashville, Tenn., district.

TABLE 3.—*Statement of floating plant owned by the United States*

CHATTANOOGA, TENN.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 9	Quarter boat	56	100	0	20	0	3	0	1907	Muscle Shoals, Can
No. 10	do	112	105	0	21	0	3	4	1908	do
No. 11	do	56	100	0	20	0	3	0	1908	do
No 20	do	93	100	0	24	0	4	6	1913	New Orleans, La
No. 21	do	100	100	0	24	0	4	2	1913	do
No. 22	do	95	100	0	24	0	4	6	1914	Chattanooga, Ten
No. 4	Derrick boat	64	80	0	32	7	3	2	1896	Knoxville, Tenn
No. 5	do	160	90	5	34	0	4	0	1908	Muscle Shoals Canal.
No. 6	do	76	80	0	30	0	4	0	1908	Knoxville, Tenn
No. 7	do	85	80	6	30	0	4	6	1909	Muscle Shoals Canal
No. 9	do	100	80	0	30	0	4	9	1912	Colbert Shoals Canal
No. 10	do	140	80	5	30	0	4	0	1913	Sheffield, Ala
No. 11	do	80	81	4	30	0	4	0	1913	New Orleans, La
No. 12	do	85	81	4	30	0	4	0	1913	do
No. 13	do	124	80	6	30	6	4	6	1913	Chattanooga, Tenn
No. 15	do	134	90	0	34	0	4	0	1914	New Orleans, La
No. 16	do	160	91	2	34	0	4	0	1914	do
No. 1	Tool boat	37	60	0	16	0	3	4	1902	Knoxville, Tenn
No. 2	Oil boat	15	64	0	16	0	2	10	1903	do
No. 2	Supply boat	37	85	0	18	0	3	0	1896	Kingston, Tenn
No. 2	Drill tender	150	80	5	30	0	4	0	1912	Sheffield, Ala
No. 3	do	131	81	1	30	0	4	6	1913	Muscle Shoals Canal
No. 4	do	117	80	6	30	6	4	6	1913	Chattanooga, Tenn
No. 2	Drill boat	18.7	40	7	14	5	3	0	1913	Muscle Shoals Canal
Nos. 13 and 14	Drill rafts	30	32	4	78	8	1	2	1913	Sheffield, Ala
No. 20	do	36	30	0	14	0	0	10	1908	Knoxville, Tenn
No. 28	do	12	30	0	14	0	0	10	1913	Hazleridge Shoals
No. 29	do		31	8	17	8			1916	Williams Shoals
No. 30	do		31	8	17	8			1916	do
No. 31	do		31	8	17	8			1916	do
No. 32	do	12	30	0	14	0	0	10	1916	Chattanooga, Tenn
No. 33	do	12	30	0	14	0	0	10	1916	do
No. 34	do	12	30	0	14	0	0	10	1916	do
No. 35	do		72	6	32	0	1	8	1917	do
No. 36	do	22.6	70	0	30	0	1	8	1916	Coulter Island Shoals
No. 37	do	30	32	4	78	8	1	2	1915	Kogers Island Shoals
No. 22	215-ton barge	41.5	100	0	24	0	5	0	1905	Muscle Shoals Canal.
No. 25–R	225-ton barge	45.3	100	0	24	0	5	0	1915	Chattanooga, Tenn
No. 26	224-ton barge	57.5	100	6	24	6	4	10	1908	Muscle Shoals Canal.
No. 26–R	225-ton barge	45.3	100	0	24	0	5	0	1915	Chattanooga, Tenn
No. 28	106-ton barge	51	100	0	20	0	3	0	1908	Knoxville, Tenn
No. 31	120-ton barge	45	50	2	24	6	5	3	1908	Muscle Shoals Canal.
No. 34	250-ton barge	75	120	0	24	2	5	4	1908	do
No. 35	112-ton barge	31	50	0	24	8	5	0	1911	do
No. 36	120-ton barge	45	50	0	24	6	5	3	1912	do
No. 37	50-ton barge	20	70	0	16	6	3	8	1908	do
No. 40	112-ton barge	45	50	0	24	8	5	0	1910	do
No. 41	300-ton barge	103	120	0	24	2	6	0	1912	do
No. 42	32-ton barge	17.4	60	0	12	0	3	2	1911	Knoxville, Tenn
No. 44	160-ton barge	34	80	0	20	6	4	9	1912	Riverton, Ala
No. 45	do	34	80	0	20	6	4	9	1912	do
No. 46	125-ton barge	45	80	5	20	5	4	0	1912	Sheffield, Ala
No. 47	do	45	80	5	20	5	4	0	1912	do
No. 52	100-ton barge	25	80	0	20	6	4	0	1912	Knoxville, Tenn
No. 53	do	25	80	0	20	6	4	0	1912	do
No. 54	112-ton barge	28	80	8	20	4	4	6	1912	Muscle Shoals Canal.
No. 55	do	28	80	8	20	4	4	6	1912	do
No. 56	31-ton barge	11	60	0	14	10	2	4	1914	do
No. 57	112-ton barge	54	80	0	20	0	4	6	1908	Knoxville, Tenn
No. 58	89-ton barge	47	80	0	20	0	4	0	1913	New Orleans, La
No. 59	do	47	80	0	20	0	4	0	1913	do
No. 60	112-ton barge	54	80	0	20	0	4	6	1913	do
No. 61	do	54	80	0	20	0	4	6	1913	do
No. 62	300-ton barge	89	120	6	32	8	5	0	1913	do
No. 63	do	89	120	6	34	0	5	0	1913	do
No. 64	112-ton barge	32	80	0	20	0	4	6	1913	do
No. 65	125-ton barge	45	80	0	20	0	4	0	1913	do
No. 66	100-ton barge	63.9	80	6	20	6	4	6	1913	Chattanooga, Tenn
No. 67	do	25	80	0	20	6	4	0	1913	do

[1] Rebuilt by United States. Quarter boat No. 2 is now being reported as supply boat No. 2. Derrick boats No. 8 and No. 14 transferred to Nashville, Tenn., district.

[2] Rebuilt by United States. Tool boat No. 2 now reported as oil boat No. 2. Drill raft No. 4 now shown s drill raft No. 37.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

CHATTANOOGA, TENN.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$2,437.00	$600.00	Good.		Tennessee River.
		do.	3,257.00	2,480.00	Fair.	$135.68	Do.
		do.	2,750.00	1,984.00	Poor.	911.17	Do.
		do.	5,337.00	3,189.00	Good.	122.14	Do.
		do.	8,143.63	5,486.00	do.	125.00	Do.
		do.	8,503.53	4,896.00	do.	865.67	Do.
		do.	[1] 3,325.00	3,841.00	New.	3,240.52	Do.
		do.	[1] 3,946.00	3,459.00	Poor.	608.55	Do.
		do.	[1] 3,624.00	3,437.00	do.	911.76	Do.
		do.	5,407.00	3,342.00	Fair.	809.97	Do.
		do.	6,703.00	2,180.00	Poor.	436.14	Colbert Shoals Canal.
		do.	5,556.14	2,968.00	do.	424.32	Tennessee River.
		do.	8,293.22	4,355.00	Fair.	438.55	Do.
		do.	8,527.13	4,777.00	do.	1,504.30	Do.
		do.	8,527.13	5,286.00	Poor.	2,038.80	Do.
		do.	9,295.03	5,827.00	Good.	831.26	Do.
		do.	9,002.05	6,894.00	Fair.	1,323.51	Do.
		do.	660.00	475.00	do.	102.00	Do.
		do.	600.00	20.00	Good.	23.32	Do.
		do.	800.00		Wrthls.	7.00	Do.
		do.	5,885.72	3,056.00	Poor.		Do.
		do.	6,933.78	3,682.00	Good.	504.12	Do.
		do.	6,969.08	4,183.00	Poor.	510.81	Do.
		do.	2,670.13	1,887.00	Fair.		Do.
		do.	1,640.00	156.00	Poor.	415.59	Do.
		do.	225.00		Wrthls.		Do.
		do.	156.00		do.		Do.
		do.	107.29	92.00	Fair.	49.03	Do.
		do.	199.68	93.00	do.	49.28	Do.
		do.	199.67	92.00	do.	47.17	Do.
		do.	168.08	67.00	Poor.		Do.
		do.	168.08	67.00	do.		Do.
		do.	168.08	67.00	do.		Do.
		do.	1,328.73	1,108.00	Fair.	213.60	Do.
		do.	1,094.76	550.00	Poor.	437.57	Do.
		do.	968.07	483.00	do.		Do.
		do.	[1] 2,314.31	843.00	Fair.		Do.
		do.	2,504.86	1,792.00	Good.		Do.
		do.	2,103.01		Wrthls.		Do.
		do.	2,212.62	1,520.00	Good.		Do.
		do.	1,049.65		Wrthls.	243.07	Do.
		do.	1,177.29	483.00	Fair.		Do.
		do.	[1] 2,756.14	1,423.00	Good.		Do.
		do.	1,614.63	366.00	Fair.		Do.
		do.	2,000.11	625.00	Poor.	161.71	Do.
		do.	950.62	202.00	do.		Do.
		do.	1,352.32	185.00	Fair.		Do.
		do.	4,203.95	942.00	Poor.	13.16	Do.
		do.	466.00		Wrthls.	9.77	Do.
		do.	[1] 2,933.87	2,030.00	Good.	46.80	Colbert Shoals Canal.
		do.	2,933.87	400.00	Wrthls.		Do.
		do.	1,941.28	1,712.00	Good.	1,173.25	Tennessee River.
		do.	1,941.28	1,839.00	do.	1,256.57	Do.
		do.	1,762.23	546.00	Fair.	464.47	Do.
		do.	1,715.68	536.00	do.	473.59	Do.
		do.	2,262.03	518.00	do.		Do.
		do.	2,262.03	518.00	do.		Do.
		do.	595.53	372.00	do.		Muscle Shoals Canal.
		do.	1,417.35	505.00	do.	3.48	Tennessee River.
		do.	2,157.59	630.00	Poor.	580.71	Do.
		do.	2,157.29	629.00	Good.	394.53	Do.
		do.	2,157.29	628.00	Poor.		Do.
		do.	2,157.29	855.00	do.	47.76	Do.
		do.	4,045.78	2,999.00	Good.	123.42	Do.
		do.	4,045.78	3,483.00	do.	433.40	Do.
		do.	2,157.29	856.00	Fair.	61.24	Do.
		do.	2,157.29	856.00	Poor.		Do.
		do.	1,734.63	738.00	Fair.	33.67	Do.
		do.	1,759.30	763.00	do.	53.45	Do.

[1] Rebuilt by United States. Barge No. 43 condemned and destroyed during year. Barge No. 62 equipped with machinery for carpenter shop. Barge No. 63 equipped with machinery for machine shop, blacksmith shop, and ice plant.

TABLE 3.—*Statement of floating plant owned by the United States and*

CHATTANOOGA, TENN.—Continued.

Name or number.	Type.	Dis-placement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 68	60-ton barge	25	60	3	18	0	8	7	1913	Knoxville, Tenn
No. 69	do	25	60	3	18	0	3	7	1913	do
No. 72	112-ton barge	32	80	0	20	0	4	6	1913	New Orleans, La
No. 73	do	47	80	0	20	0	4	6	1913	do
No. 74	do	54	80	0	20	0	4	6	1913	do
No. 75	do	54	80	0	20	0	4	6	1913	do
No. 76	do	47	80	0	20	0	4	6	1913	do
No. 77	do	54	80	0	20	0	4	6	1913	do
No. 78	do	32	80	0	20	0	4	6	1913	do
No. 79	do	54	80	0	20	0	4	6	1913	do
No. 80	300-ton barge	95	119	9	24	0	6	6	1913	do
No. 81	205-ton barge	67	100	5	24	5	5	0	1914	Kogers Island, Ala
No. 82	do	67	100	5	24	5	5	0	1915	Smithsonia, Ala
No. 84	41-ton barge	19.8	71	0	15	0	3	5		
No. 88	240-ton barge	38.2	100	0	24	6	5	0	1917	Chattanooga, Tenn
No. 89	do	38.2	100	0	24	6	5	0	1917	do
No. 90	do	38.2	100	0	24	6	5	0	1917	do
No. 4–R	75 cubic yard dump scow	82	73	0	20	0	6	0	1915	do
No. 5	do	82	73	0	20	0	6	0	1909	Muscle Shoals Canal
No. 6–R	do	82	73	0	20	0	6	0	1915	Chattanooga, Tenn
No. 7	do	82	73	0	20	0	6	0	1909	Muscle Shoals Canal
No. 8	do	82	73	0	20	0	6	0	1910	do
No. 9	do	82	73	0	20	0	6	0	1911	do
No. 10	do	82	73	0	20	0	6	0	1911	do
No. 11	do	82	73	0	20	0	6	0	1911	do
No. 12	do	82	73	0	20	0	6	0	1911	do
No. 13	do	82	73	0	20	0	6	0	1912	do
No. 14	do	82	73	0	20	0	6	0	1912	Knoxville, Tenn
No. 14–R	do	82	73	0	20	0	6	0	1915	Chattanooga, Tenn
No. 15	do	82	73	0	20	0	6	0	1912	Knoxville, Tenn
No. 16	do	82	73	0	20	0	6	0	1912	Muscle Shoals Canal
No. 17	do	82	73	0	20	0	6	0	1913	Chattanooga, Tenn
No. 18	do	82	73	0	20	0	6	0	1917	do

CHICAGO, ILL.

Name or number.	Type.	Dis-placement in long tons.	Length.		Beam.		Depth.		When.	Where.
Illinois	Dipper dredge	280.00	98	0	34	0	8	0	1914	Peoria, Ill
Comanche	Towboat	200.00	120	0	27	0	5	4	1915	Dubuque, Iowa
Fox	do	17.00	80	2	12	3	3	0	1897	Keokuk, Iowa
Pearl	do	40.00	100	1	18	0	4	1	1909	Beardstown, Ill
Dearborn	Steam launch	9.00	50	0	8	6	3	2	1902	Racine, Wis
Chicago	Gasoline cruiser	53.00	75	4½	15	6	9	3	1916	Milwaukee, Wis
Seminole [2]	Gasoline launch	2.00	38	9	11	4	5	9	1913	Racine, Wis
Sea Gull	do	7.00	38	0	10	0	3	9	1913	Michigan City, Ind
M. C	Power skiff		16	0	4	0	1	10	1909	do
No. 1	Derrick scow	9.00	34	3	13	2	3	0	1913	do
No. 1	Deck scow	100.00	40	2	17	2	3	7	1914	do
No. 1	Survey scow	50.00	55	0	12	0	3	2	1916	do
None [3]	Office boat	48.00	100	0	20	0	4	0	1878	Peoria, Ill
Margaret	Quarter boat	130.00	100	0	26	0	4	3	1893	Gasconade, Mo
No. 3	do	11.00	50	0	16	0	3	6	1893	Peoria, Ill
No. 6	150-ton barge	48.00	100	0	20	0	4	6	1904	Beardstown, Ill
No. 7	do	48.00	100	0	20	0	4	0	1905	do
No. 8	do	35.00	80	0	20	0	5	0	1911	Peoria, Ill
No. 9	50-ton barge	24.00	60	0	16	0	4	2	1913	do
No. 10	400-ton barge	70.00	120	0	28	0	6	0	1917	do
No. 12	80 cubic yard dump scow	39.00	70	0	18	0	5	3	1907	Beardstown, Ill
No. 13	do	39.00	70	0	18	0	5	3	1908	do
No. 14	100 cubic yard dump scow	45.00	78	8	20	0	5	9	1915	Peoria, Ill
No. 15	do	45.00	78	8	20	0	5	9	1915	do
La Salle	Power skiff	1.00	22	0	4	6	1	3	1915	do

---

[1] Rebuilt by United States. Barge No. 86 transferred to Nashville, Tenn., district. Dump scow No. 6 condemned and destroyed during year.

mployed in the Engineer Department at large on Dec. 31, 1917—Continued.

CHATTANOOGA, TENN.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$1,079.43	$470.00	Poor..	$35.34	Tennessee River.
		...do...	1,103.74	420.00	..do....	77.62	Do.
		...do...	2,147.24	1,066.00	Fair...		Do.
		...do...	2,147.24	936.00	Poor..	448.89	Do.
		...do...	2,147.24	936.00	Fair...	676.60	Do.
		...do...	2,147.24	1,058.00	..do....	503.64	Do.
		...do...	2,147.24	1,058.00	..do....	501.26	Do.
		...do...	2,147.24	1,058.00	..do....	494.24	Do.
		...do...	2,159.75	1,072.00	Good..	5.77	Do.
		...do...	2,159.75	1,103.00	Fair...	2.50	Do.
		...do..	4,664.73	2,316.00	Good..		Do.
		...do...	3,598.58	1,965.00	..do....	193.15	Do.
		...do...	3,457.56	2,203.00	..do....	218.20	Do.
1915	Knoxville, Tenn	...do...	350.00	362.00	Fair...	15.50	Do.
		...do...	3,093.74	2,997.00	Good..		Do.
		...do...	3,057.30	2,993.00	..do....		Do.
		...do...	2,848.37	2,803.00	..do....		Do.
		...do..	2,712.37	1,017.00	Poor..	130.98	Do.
		...do...	[1] 2,605.95	1,863.00	...do ..	1,312.32	Do.
		...do...	2,627.76	1,472.00	...do ..	256.48	Do.
		...do...	[1] 2,216.07	1,675.00	Good .	1,371.08	Do.
		...do ..	2,949.39	108.00	Poor..	356.48	Do.
		...do ..	2,626.99		Worthless.	317.48	Do.
		...do ..	2,626.99		...do ..	259.06	Do.
		...do ..	2,626.99	1,051.00	Good .	1,214.40	Do.
		...do ..	2,626.99	1,072.00	...do ..	1,245.70	Do.
		...do ..	3,441.73	382.00	Poor..	100.54	Do.
		.. do ..	2,920.31	250.00	...do ..	483.72	Do.
		...do ..	2,532.47	1,780.00	...do ..	1,140.74	Do.
		...do ..	2,723.87	275.00	...do ..	554.53	Do.
		...do ..	3,708.44	1,535.00	Good .	1,451.59	Do.
		...do ..	3,007.51	912.00	Poor..	45.66	Do.
		...do ..	3,650.70	2,920.00	Good .	62.11	Do.

CHICAGO, ILL.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
		Wood.	$33,660.25	$28,860.00	Good .	$906.47	Illinois River, Ill.
1915	Dubuque, Iowa.	Steel..	34,805.00	30,180.00	...do ..	338.16	Do.
		Wood.	4,385.00	100.00	Unserviceable.	6.25	Do.
		...do ..	7,000.00	6,300.00	Good .	222.86	Do.
1902	Racine, Wis.....	Steel..	5,000.00	500.00	Fair...		Do.
1916	Milwaukee, Wis .	Wood.	19,990.00	18,000.00	Good .	700.52	Chicago district works except Illinois River.
1913	Racine, Wis.....	...do ..	2,226.00	3,500.00	...do ..	2,289.86	Chicago Harbor, Ill.
1917	Michigan City, Ind.	...do ..	1,000.00	900.00	...do ..	57.25	Michigan City Harbor, Ind.
1909	.....do	...do ..	100.00	250.00	...do ..	4.95	Do.
		...do ..	480.00	450.00	...do ..	177.62	Do.
		...do ..	439.00	425.00	...do ..		Do.
		...do ..	1,526.50	1,550.00	...do ..		Calumet River, Ill. and Ind.
		...do ..	5,000.00	2,000.00	...do ..	227.81	Illinois River, Ill.
		...do ..	Unknown.	5,250.00	Fair...	108.86	Do.
		...do ..	775.00	475.00	Cabin good; hull poor.	25.00	Do.
		...do ..	1,200.00	800.00	Good .	714.76	Do.
		...do ..	1,200.00	775.00	...do ..	434.86	Do.
		...do ..	1,215.00	980.00	...do ..	60.63	Do.
		...do ..	895.75	750.00	...do ..	56.24	Do.
		...do ..	2,759.43	2,759.43	...do ..		Do.
		...do ..	1,350.00	480.00	Poor..	260.84	Do.
		...do ..	1,350.00	950.00	Good .	722.67	Do.
		...do ..	1,767.82	1,435.00	...do ..	224.76	Do.
		...do ..	1,777.36	1,500.00	...do ..	220.72	Do.
		...do ..	255.00	150.00	Fair...	11.10	Do.

---

[1] Original Monarch engine replaced by Wolverine engine September, 1917.

[2] Rebuilt, 1897, Kempsville, Ill.

TABLE 3.—*Statement of floating plant owned by the United States and*

CINCINNATI, OHIO, FIRST DISTRICT.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Indiana	Pipe line hydraulic dredge.	417.5	125	0	34	0	6	10	1908	Jeffersonville, Ind
Ohio	Dipper dredge	270.0	112	0	31	6	6	8	1880	St. Louis, Mo.[1]
Oswego	do	235.0	94	0	31	6	6	1	1883	do
Cincinnati	do	297.0	115	6	34	0	6	10	1915	Jeffersonville, Ind
Marietta	do	297.0	115	6	34	0	6	10	1915	Dubuque, Iowa
Woodruff, E. A	Sidewheel snag boat	863.0	226	0	[2]48	0	7	6	1876	Pittsburgh, Pa
Iroquois	Sternwheel snag boat	176.8	148	2	28	6	4	0	1912	Dubuque, Iowa
Nell	Gasoline launch	1.5	25	0	5	9	2	8	1893	Gloucester City, N. J.
Mignon	do	.5	18	4	5	2	2	1	1910	Salem, Ohio
Chico	do	.6	20	0	5	0	2	2		
Clermont	do	.9	25	9	6	0	3	0	([3])	New Richmond, Ohio.
Sisters, The	do	.5	25	0	4	4	3	0	1911	Golconda, Ill
Miami	Sternwheel towboat	229	157	11	31	1	4	3	1912	Cincinnati, Ohio
Guyandot	do	229	157	11	31	1	4	3	1912	do
Scioto	do	229	157	11	31	1	4	3	1912	do
Cayuga	do	254.3	163	8	31	1	4	3	1916	do
Ottawa	do	254.3	163	8	31	1	4	3	1916	do
Comet	Sternwheel towboat (gas)	21.0	69	0	16	0	2	4		
Mingo	Derrick boat	116.3	94	0	32	0	5	0	1912	Dubuque, Iowa
No. 1	do	107.1	70	0	32	0	5	0	1914	Jeffersonville, Ind
No. 2	do	107.1	70	0	32	0	5	0	1914	do
No. 3	do	107.1	70	0	32	0	5	0	1915	do
No. 4	do	107.1	70	0	32	0	5	0	1915	do
No. 5	Derrick boat (hull only).	51.7	64	0	34	9	5	0		
No. 2	Maneuver boat (temporary).[4]	95	90	0	20	0	5	0	1909	Levanna, Ohio
No. 29	do	53.3	60	0	22	0	3	10	1916	Dam No. 1, Ohio River.
No. 37	do.[5]	71.0	75	0	22	0	3	3	1910	Elizabeth, Pa
No. 1	Pumpboat	151.2	100	0	30	0	5	2	1914	Levanna, Ohio
No. 1	Concrete mixing plant	208.1	80	0	36	0	6	3	1915	Dam No. 39, Ohio River.
No. 4	Dump scow (106 cubic yards).	70.0	75	0	20	0	5	8	1895	Jeffersonville, Ind
Nos. 5–12	Dump scow (125 cubic yards).	74.5	85	8	22	7	6	0	1915	Ambridge, Pa
Nos. 3 and 4	Flatboat (3 tons)	3.5	26	0	4	6	1	6	1897	Cincinnati, Ohio
No. 5	Flatboat (6 tons)	8.0	35	0	9	0	1	7	1901	Paducah, Ky
No. 6	Flatboat (206 tons)	63.0	110	0	24	0	5	0	1908	Ambridge, Pa
Nos. 7, 8 and 9	Flatboat decked	63.0	110	0	24	0	5	0	1911	do
Nos. 10–12	Flatboat	32.2	80	0	18	0	4	6	1914	New Albany, Ind
No. 13	Flatboat (gravel washer)	44.8	80	0	18	0	4	6	1914	do
No. 14	Flatboat (20 tons)	19.1	60	0	20	0	2	2	1914	Cincinnati, Ohio
Nos. 15–18	Flatboat	60.4	110	0	24	0	5	0	1916	do
No. 19[7]	do	16.0	30	0	9	6	2	6	1901	New Albany, Ind
Nos. 1–4	Barges (206 tons)	63.0	110	0	24	0	5	0	1911	Ambridge, Pa
No. 5	do	63.0	110	0	24	0	5	0	1911	do
No. 6	do	63.0	110	0	24	0	5	0	1911	do
No. 7	Barges decked	39.7	80	0	18	0	5	6		
No. 8	do	27.9	60	10	16	0	3	10		
No. 9	Barges decked (175 tons).	32.5	90	0	24	0	4	6	1914	Elizabeth, Pa
No. 10	do	32.5	90	0	24	0	4	6	1914	do
No. 11	Barges decked (200 tons).	45.3	90	0	24	0	5	7	1914	do
No. 12	do	45.3	90	0	24	0	5	7	1914	do
No. 13	Barges (300 tons)	114.9	100	0	24	0	5	6		
No. 14	Barges, transfer (300 tons).	114.9	100	0	24	0	5	6		
No. 15	Barges	60.4	110	0	24	0	5	0	1916	Cincinnati, Ohio
No. 16	do	33.0	90	0	24	0	4	6	1915	Dam No. 39, O. R.
No. 17	do	33.0	90	0	24	0	5	6	1915	do

[1] Remodeled 1895–96.

[2] Beam over all 73 feet.

[3] Rebuilt 1916.

[4] Formerly flatboat No. 2; rebuilt Fernbank, Ohio.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

CINCINNATI, OHIO, FIRST DISTRICT.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Steel..	$98,652.02	$95,000.00	Good..	$1,420.08	Improving Ohio River.
......	....	Iron...	35,000.00	34,000.00	...do...	5,522.48	Do.
......	....	...do...	35,000.00	32,500.00	...do...	3,385.73	Do.
......	....	Steel and iron.	70,656.36	70,656.00	...do...	4,848.19	Do.
......	....	...do...	73,397.93	73,397.00	...do...	4,919.98	Do.
......	....	...do...	133,491.81	48,000.00	...do...	....	Do.
......	....	Steel..	34,426.85	28,500.00	...do...	2,408.52	Do.
1893	Gloucester City, N. J.	Wood.	1,102.50	10.00	Poor..	....	Do.
1910	Cincinnati, Ohio	Steel..	398.43	250.00	Good..	....	Do.
1913	Portsmouth, Ohio.	...do...	541.50	50.00	Poor..	....	Do.
......	....	Wood.	260.00	300.00	Good..	75.06	Do.
1914	Golconda, Ill....	...do...	275.00	10.00	Poor..	....	Do.
......	....	Steel and iron.	46,026.66	44,000.00	Good..	499.64	Do.
......	....	...do...	46,026.66	44,000.00	...do...	376.05	Do.
......	....	...do...	46,120.91	35,000.00	...do...	3,173.51	Do.
......	....	Steel..	49,691.90	49,691.00	...do...	395.42	Do.
......	....	...do...	49,706.89	49,706.00	...do...	379.52	Do.
1912	Hanging Rock, Ohio.	Wood.	2,000.00	400.00	Poor..	....	Do.
......	....	Steel..	31,494.00	29,000.00	Good..	846.38	Do.
......	....	...do...	12,324.08	12,300.00	...do...	2,432.87	Do.
......	....	...do...	12,302.27	12,300.00	...do...	2,247.60	Do.
......	....	...do...	13,444.96	13,000.00	...do...	2,642.38	Do.
......	....	...do...	13,105.89	13,000.00	...do...	2,431.86	Do.
1917	New Richmond, Ohio.	....	200.00	10.00	Poor..	....	Do.
......	....	Wood.	1,750.00	7,500.00	Good..	....	Do.
......	....	Steel..	7,966.49	7,966.00	...do...	2.50	Do.
......	....	Wood.	8.882,61	4.500,00	...do..	61,98	Do.
......	....	...do...	16,281.76	10,520.00	Fair...	1,786.59	Do.
......	....	...do...	12,636.39	12,000.00	Good..	826.58	Do.
......	....	...do..	2,750.00	100.00	Poor..	....	Do.
......	....	Steel..	[6] 7,775.00	7,000.00	Good..	734.12	Do.
......	....	...do...	[6] 94.00	20.00	Fair...	....	Do.
......	....	Wood.	100.00	10.00	Poor..	....	Do.
......	....	Steel..	7,245.00	5,700.00	Good..	....	Do.
......	....	...do...	[6] 6,100.00	5,700.00	...do...	....	Do.
......	....	...do...	[6] 3,699.00	3,200.00	...do...	....	Do.
......	....	...do...	3,699.00	3,500.00	...do...	597.61	Do.
......	....	Wood.	625.00	400.00	...do...	5.53	Do.
......	....	Steel..	[6] 5,972.00	5,972.00	...do...	....	Do.
......	....	...do...	2,358.33	100.00	...do...	....	Do.
......	....	...do...	[6] 5,000.00	4,000.00	...do...	....	Do.
......	....	...do...	5,000.00	4,000.00	...do...	....	Do.
......	....	...do...	5,000.00	4,700.00	...do...	....	Do.
1911	Cincinnati, Ohio	Wood.	750.00	650.00	...do...	....	Do.
1911	.....do..........	...do...	750.00	650.00	...do...	....	Do.
......	....	...do...	2,209.53	1,768.00	...do...	97.96	Do.
......	....	...do...	2,209.52	1,768.00	...do...	20.60	Do.
......	....	...do...	1,685.42	1,214.00	...do...	1,392.62	Do.
......	....	...do...	1,685.42	1,214.00	...do...	951.78	Do.
1914	Evansville, Ind.	...do...	2,500.00	1,875.00	...do...	86.53	Do.
1914	.....do..........	...do...	5,842.93	4,381.00	...do...	143.18	Do.
......	....	Steel..	5,730.00	5,700.00	...do...	....	Do.
......	....	Wood.	2,566.09	1,925.00	...do...	331.44	Do.
......	....	...do...	2,566.08	1,925.00	...do...	181.32	Do.

---

[5] Formerly "No name."

[6] Each.

[7] Formerly steam launch "E. A. W."

TABLE 3.—*Statement of floating plant owned by the United States*

CINCINNATI, OHIO, FIRST DISTRICT—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft.in.	*Ft.in.*	*Ft.in.*		
No. 18	Barges	33.0	90 0	24 0	4 6	1915	Dam No. 39, O. R.
No. 19	....do	33.0	90 0	24 0	4 6	1915	....do
No. 20	....do	42.0	90 0	24 0	5 6	1915	....do
No. 21	....do	42.0	90 0	24 0	5 6	1915	....do
No. 22	Barges (transfer)	78.2	100 0	26 0	5 6	1915	....do
No. 23	....do	78.2	100 0	26 0	5 6	1915	Dam No. 39, O. R.
No. 24	....do	60.4	110 0	24 0	5 0	1916	Cincinnati, Ohio
No. 25	....do	58.0	72 0	19 0	5 4		
No. 26	....do	15.9	60 0	16 0	3 4		Dam No. 39, O. R.
No. 27	....do	15.9	60 0	16 0	3 4		....do
No. 28	....do	3.5	30 0	8 0	1 8		....do
No. 29	....do	4.5	32 0	15 0	1 11		
No. 30	....do	4.5	32 0	15 0	1 11		
No. 1	Fuel flat [1]	10.0	40 0	14 0	2 10	([2])	
Nos. 1-10	Pontoons	17.0	40 0	12 0	3 2	1908	Springfield, Ill

CINCINNATI, OHIO, SECOND DISTRICT.

Carrollton	Dipper dredge	250.00	86 0	30 0	6 9	[3]1901	Hull at Ambridge, Pa.; machinery at South Milwaukee, Wis.
Frankfort	....do	115.00	72 0	28 0	5 5	[4]1908	Hull at Dam No. 39, Ohio River; machinery at Marion, Ohio.
Malta	Endless chain or ladder dredge.	160.00	70 0	31 4	6 10	[5]1887-88	Cincinnati, Ohio; machinery at Bucyrus, Ohio.
Kentucky	Tow and snag boat	370.00	148 0	30 0	5 6	1909	Jeffersonville, Ind
Gregory	Tow and survey boat (paddle) steam.	240.00	131 0	22 0	4 2	1910	....do
Merrill	....do	163.00	131 6	23 0	3 6	1907-8	....do
Vega [6]	....do	112.00	118 6	19 2	4 0	1901	....do
Pearl	Gasoline launch	5.00	40 0	7 6	4 0		
Pioneer	....do	6.00	35 0	8 6	4 0		
No. 4 [7]	Derrick boat	107.00	70 0	32 0	5 0	1896	Nashville, Tenn
No. 5 [8]	....do	65.00	65 0	30 0	4 10	1895	Cincinnati, Ohio
No. 6	Piledriver	50.00	50 0	28 0	3 10	[9]1899	....do
No. 7 [10]	Needle boat	10.00	54 0	10 0	1 10	1909	....do
No. 8 [10]	....do	10.00	54 0	10 0	1 10	1910	....do
No. 9 [11]	Work and store boat	16.00	50 0	12 0	3 2	1910	....do
No. 10 [12]	Quarter boat	22.00	75 0	14 0	1 9	1904	....do
No. 11 [13]	....do	40.00	90 0	18 0	3 6	1900	....do
No. 18 [14]	72-ton deck barge	94.00	75 0	15 6	4 0	1909	....do
No. 21 [15]	19-ton deck barge	25.00	40 0	12 0	2 8	1911	....do
No. 23 [16]	190-ton deck barge	45.00	98 0	18 0	5 0	1895	....do
No. 25 [17]	120-ton deck barge	31.00	68 6	19 0	5 0	1896	Cincinnati, Ohio
No. 26 [18]	300-ton deck barge	50.00	99 0	20 0	6 0	1908	Point Pleasant, W. Va.
No. 27 [19]	....do	50.00	99 0	20 0	6 0	1908	....do
No. 28 [20]	35-ton open barge	8.00	55 0	10 0	3 6	1896	Cincinnati, Ohio
No. 29 [21]	300-ton deck barge	50.00	99 0	20 0	5 4	1910	Point Pleasant, W. Va.

[1] Formerly drill boat number 7, Louisville, Ky., district.
[2] Rebuilt 1916.
[3] Rebuilt with new steel hull, 1915.
[4] Rebuilt with new wooden hull, 1915.
[5] Reconstructed in 1909.
[6] Sold to Arthur L. Wallace, 801 Bessemer Building, Pittsburgh, Pa., for $3,001 on sealed proposals received and opened Dec. 14, 1917. Authority dated Oct. 26, 1917 (E. D. file 65968/19).
[7] Fomerly No. 1, reconstructed with new steel hull, 1915.
[8] Fomerly No. 2, rebuilt with new steel hull, 1913.
[9] Rebuilt in 1909-10.
[10] Dropped on certificate; Aug. 2, 1917 (E. D. file 79091/128).

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

CINCINNATI, OHIO, FIRST DISTRICT—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$2,122.64	$1,592.00	Good..	$305.47	Improving Ohio River.
		...do...	2,174.69	1,631.00	...do...	461.13	Do.
		...do...	2,326.80	1,745.00	...do...	102.36	Do.
		...do...	2,297.92	1,723.00	...do...	91.01	Do.
		...do...	3,406.48	2,555.00	...do...	95.18	Do.
		...do...	3,400.54	2,492.00	...do...	102.49	Do.
		Steel..	5,730.00	5,730.00	...do...		Do.
		Wood.		500.00	Poor..		Do.
		...do...	707.63	529.00	Good..	12.80	Do.
		...do...	707.64	529.00	...do...	12.80	Do.
		...do...	279.00	210.00	...do...		Do.
		...do...	83.60	63.00	...do...	2.25	Do.
		...do...	83.60	63.00	...do...		Do.
1913	Louisville, Ky..	...do...	50.00	300.00	...do...		Do.
		Steel..	13,800.00	12,000.00	...do...		Do.

CINCINNATI, OHIO, SECOND DISTRICT.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
		Steel..	$22,272.00	$23,750.00	Good..	$1,047.74	Kentucky River, Ky.
		Wood.	10,193.28	12,600.00	...do...	132.75	Do.
		...do...	13,000.00	6,640.00	Fair...	1,489.99	Muskingum River, Ohio.
		...do...	27,078.50	15,000.00	Poor..	1,763.55	Kentucky River, Ky.
		...do...	16,915.00	12,600.00	Good..	3,831.06	Do.
		...do...	14,400.00	6,426.00	Fair...	302.54	Muskingum River, Ohio.
		...do...	9,805.00			8.00	Do.
1899	Grand Rapids, Mich.	...do...	1,705.00	400.00	Poor..	180.30	Kentucky River, Ky.
1908	Bay City, Mich..	...do...	1,975.00	567.00	...do...	12.00	Big Sandy River, W. Va. and Ky.
		Steel..	Unknown.	10,000.00	Good..	1,550.00	Kentucky River, Ky.
		...do...	Unknown.	9,500.00	...do..	2,088.03	Do.
		Wood.	1,665.00	1,400.00	Fair...	30.96	Muskingum River, Ohio.
		...do...	235.63		Wrthls		Kentucky River, Ky.
		...do...	348.69		...do...		Do.
		...do...	806.24	425.00	Good..	11.64	Muskingum River, Ohio.
		...do...	1,600.00	1,380.00	...do..	1,195.09	Do.
		...do...	1,200.00	540.00	Poor..	526.40	Kentucky River, Ky.
		...do...	700.00	250.00	...do..		Muskingum River, Ohio.
		...do...	447.27	160.00	Fair...		Do.
		...do...	Unknown.		Wrthls	43.27	Kentucky River, Ky.
		...do..	Unknown.	1,177.77	Poor..	717.26	Do.
		...do...	2,150.00	1,080.00	Fair...	491.09	Do.
		...do...	2,150.00	1,350.00	...do...	173.09	Do.
		...do...	Unknown.		Wrthls	48.84	Do.
		...do...	2,200.00	1,080.00	Fair...	54.08	Do.

[11] Formerly Muskingum No. 1.
[12] Formerly Muskingum No. 2.
[13] Formerly Kentucky No. 1.
[14] Formerly No. 3.
[15] Formerly No. 6.
[16] Formerly No. 6. Dropped on certificate; Dec. 28, 1917 (E. D. file 79091/129).
[17] Formerly No. 8.
[18] Formerly No. 10.
[19] Formerly No. 11.
[20] Dropped on certificate; Dec. 29, 1917 (E. D. file 79091/131).
[21] Formerly No. 13.

TABLE 3.—*Statement of floating plant owned by the United States and*

CINCINNATI, OHIO, SECOND DISTRICT—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 33 [1]	10-ton push boat	14.00	36 0	10 0	1 8		
No. 35 [2]	12-ton push boat	17.00	40 0	10 0	1 10		
No. 36 [3]	80 cubic yards dump scow.	30.00	75 0	17 0	6 4½	1911	Jeffersonville, Ind
No. 37 [3]	do	30.00	75 0	17 0	6 4½	1911	do
X, B. S. R. [4]	Maneuver boat	65.00	65 0	30 0	5 2	1911	Louisa, Ky
No. 1, L. F. [5]	do	50.00	60 0	26 0	3 4	1911	do
No. 41	10-ton push boat	14.00	36 0	10 0	1 8	1911	do
No. 42	200-ton deck barge	220.00	100 0	20 0	5 0	1912	Ambridge, Pa
No. 43	do	220.00	100 0	20 0	5 0	1912	do
No. 44	Quarter boat	40.00	50 0	22 0	3 6	1912	Pittsburgh, Pa
No. 1, B. S. R. [6]	Maneuver boat	75.00	65 0	30 0	4 10	1913	New Albany, Ind
No. 2, B. S. R. [7]	do	55.00	60 0	26 0	3 6	1913	do
No. 1, T. F. [8]	do	55.00	60 0	26 0	3 6	1915	Jeffersonville, Ind
No. 48	200-ton deck barge	220.00	100 0	20 0	5 0	1915	Ambridge, Pa
No. 49	do	220.00	100 0	20 0	5 0	1915	do
No. 50	150-ton deck barge	150.00	80 0	18 0	4 3	1914	New Albany, Ind
No. 51	90-ton deck barge	140.00	80 0	18 0	4 6	1914	do
No. 52	do	140.00	80 0	18 0	4 6	1914	do
No. 53	125 cubic yards dump scow.	75.00	85 9	22 8	6 0	1915	Ambridge, Pa
No. 54	do	75.00	85 9	22 8	6 0	1915	do
No. 55	Needle boat	10.00	54 0	10 0	1 8	1916	Frankfort, Ky
No. 3, B. S. R. [9]	Maneuver boat	55.00	60 0	26 0	3 6	1916	Ambridge, Pa
No. 57	Needle boat	10.00	54 0	10 0	1 8	1916	Frankfort, Ky
No. 58	do	10.00	54 0	10 0	1 8	1916	do
No. 59	92 cubic yards dump scow.	200.00	56 6	26 9	6 1	1916	McConnelsville, Ohio
No. 60	do	200.00	56 6	26 9	6 1	1916	do
No. 61	10-ton push boat	14.00	36 0	10 0	1 8	1913	Louisa, Ky
No. 62	Needle boat	10.00	54 0	10 0	1 8	1916	Frankfort, Ky
No. 63	Derrick boat	68.00	65 0	30 0	5 4	1917	McConnelsville, Ohio

CLEVELAND, OHIO.

Name or number.	Type.	Displacement in long tons.	Length.	Beam.	Depth.	When.	Where.
Burton	Seagoing hopper dredge	1,510.00	177 0	38 0	19 0	1905	Sparrows Point, Md
Maumee	Dipper dredge	549.00	100 0	36 2	11 0	1894	Cleveland, Ohio.
Spear	Steam tug	160.00	87 0	19 8	11 0	1904	Huron, Ohio.
Quest	do	46.00	65 0	15 0	8 0	1903	Ashtabula, Ohio.
Inspector	Gasoline launch	6.00	32 2	6 6	4 6	1901	Detroit, Mich.
Ariel	do	6.00	36 0	7 3	4 7	1905	Ashtabula, Ohio.
Burton, No. 22	do	.90	20 0	4 2	2 4	1905	Cleveland, Ohio.
No. 1	400-ton derrick barge	185.00	102 6	32 0	7 10	1906	Superior Entry, Wis.
No. 4	Dump scow, 7 pockets	(12)	125 0	34 0	10 6	1907	Port Clinton, Ohio.
No. 5	do	(12)	125 0	34 0	10 6	1907	do
No. 2	Deck scow		23 1	11 6	2 6	1906	Ashtabula, Ohio

---

[1] Formerly Louisa No. 1.
[2] Formerly Louisa No. 3.
[3] Dropped on certificate; Aug. 2, 1917 (E. D. file 79091/128).
[4] Formerly No. 38.
[5] Formerly No. 39.
[6] Formerly No. 45.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

CINCINNATI, OHIO, SECOND DISTRICT—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1910	Louisa, Ky.	Wood.	$124.50		Wrthls		Big Sandy River, W. Va. and Ky.
1907	Catlettsburg, Ky.	do.	65.00	$23.13	Good.		Do.
		do.	3,220.00		Wrthls		Kentucky River, Ky.
		do.	3,220.00		do.		Do.
		do.	5,068.69	4,318.71	Fair.	256.35	Big Sandy River, W. Va. and Ky.
		do.	3,367.87	1,880.00	do.	4.00	Do.
		do.	146.28	77.70	do.		Do.
		Steel.	4,900.00	3,325.00	Good.	436.43	Kentucky River, Ky.
		do.	4,900.00	3,325.00	do.	483.54	Do.
		do.	3,026.92	1,900.00	do.	55.50	Do.
		do.	8,649.20	6,940.00	do.	490.00	Big Sandy River, W. Va. and Ky.
		do.	6,836.55	5,579.00	Fair.	13.75	Do.
		do.	4,575.00	4,129.00	Good.		Do.
		do.	4,850.00	4,275.00	do.	364.78	Kentucky River, Ky.
		do.	4,850.00	4,275.00	do.	376.36	Do.
		do.	3,699.00	3,171.00	do.		Big Sandy River, W. Va. and Ky.
		do.	3,736.98	3,340.00	do.	33.08	Muskingum River, Ohio.
		do.	3,708.67	3,340.00	do.	33.25	Do.
		do.	7,775.00	7,125.00	do.	170.15	Kentucky River, Ky.
		do.	7,775.00	7,125.00	do.	143.56	Do.
		do.	1,501.69	1,400.00	do.		Do.
		do.	9,829.00	9,829.00	do.		Big Sandy River, W. Va. and Ky.
		do.	1,191.31	1,100.00	do.		Kentucky River, Ky.
		do.	1,142.25	1,100.00	do.		Do.
		Wood.	3,930.40	3,500.00	do.	.48	Muskingum River, Ohio.
		do.	3,930.39	3,500.00	do.	.48	Do.
		do.	120.75	79.00	do.		Big Sandy River, W. Va. and Ky.
		Steel.	1,432.34	1,400.00	do.		Kentucky River, Ky.
		Wood.	11,166.38	11,166.00	do.		Muskingum River, Ohio.

CLEVELAND, OHIO.

1905	Sparrows Point, Md.	Steel.	$184,300.00	$150,000.00	Good.	$4,281.35	Cleveland (Ohio) district.
1894	Cleveland, Ohio.	Wood.	[10] 28,000.00	30,000.00	Fair.	1,336.40	Do.
		do.	[11] 10,500.00	18,500.00	Good.	346.50	Do.
1903	Ashtabula, Ohio.	do.	8,000.00	1,000.00	Fair.	31.72	Do.
1901	Detroit, Mich.	do.	1,375.00	800.00	Good.	748.00	Do.
1906	Ashtabula, Ohio.	do.	500.00	50.00	Poor.		Do.
1905	Cleveland, Ohio.	do.	250.00	75.00	Good.		Do.
1915	Duluth, Minn.	do.	11,860.00	9,700.00	do.	84.50	Do.
1907	Port Clinton, Ohio.	do.	14,428.00	10,000.00	do.	4,621.74	Do.
1917	do.	do.	14,477.00	10,000.00	do.	3,325.89	Do.
1906	Ashtabula, Ohio.	do.	100.00	Worthless	Unserviceable.		Do.

[7] Formerly No. 46.
[8] Formerly No. 47.
[9] Formerly No. 56.
[10] Rebuilding in 1909, $42,000.
[11] Hull and house, boiler and machinery from old discarded tug was installed.
[12] 500-yard capacity.

TABLE 3.—*Statement of floating plant owned by the United States and*

DALLAS, TEX.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Sabine	Seagoing hopper dredge.	750.00	145 0	35 0	12 0	1901	New York, N. Y.
Orange	Hydraulic pipeline dredge.	547.00	115 0	36 0	9 6	1912	Baltimore, Md.
Culberson, C. A.	Snag boat	200.00	106 0	28 0	5 0	1908	Jeffersonville, Ind.
Trinity	do	190.00	123 5	30 0	5 0	1904	Texas City, Tex.
Denison	do	250.00	136 0	32 0	4 6	1915	Dubuque, Iowa.
Beaumont	Gasoline launch	32.00	58 2	13 7	8 0	1913	Houston Heights, Tex.
Caddo	do	2.50	30 0	8 0	3 0	1911	Fulton, Ark.
Ino	do	2.00	27 10	8 4	4 0	1913	Liberty, Tex.
Jefferson	do	2.00	30 7	7 0	5 6	1913	Port Arthur, Tex.
Juanita	do	1.00	22 0	6 0	2 2	1910	Fulton, Ark.
Liberty	do	2.00	26 0	7 0	2 10	1913	Liberty, Tex.
Neches	do	1.10	26 0	6 0	2 4	1912	Salem, Ohio.
Texas	do	4.90	31 5	8 0	4 5	1917	Milwaukee, Wis.
No. 1, T. R.	Maneuver boat	39.00	44 0	20 0	3 7	1917	Lock No. 7, Trinity River.
No. 2, T. R.	do	30.00	44 0	20 0	3 7	1914	Lock No. 2, Trinity River.
No. 4, T. R.	do	25.00	44 0	20 0	3 7	1915	Lock No. 7, Trinity River.
No. 6, T. R.	do	32.00	44 0	20 0	3 7	1917	do
No. 7, T. R.	do	37.00	44 0	20 0	3 7	1916	do
No. 20, T. R.	do	21.00	44 0	20 0	3 7	1915	Lock No. 20, Trinity River.
No. 25, T. R.	do	35.00	44 0	20 0	3 7	1915	Lock No. 25, Trinity River.
No. 1, B. R.	do	60.00	70 0	22 0	4 0	......	Old Washington on Brazos River.
No. 3, B. R.	do	55.00	60 0	28 0	3 0	1914	Lock No. 8, Brazos River.
No. 6, B. R.	do	55.00	60 0	28 0	3 0	1914	do
No. 8, B. R.	do	55.00	60 0	28 0	3 0	1914	do
No. 1, Neches River	Quarterboat	27.00	60 0	16 0	4 0	1906	Beaumont, Tex.
No. 2, Cypress Bayou	do	35.00	55 6	22 0	3 6	1912	Jefferson, Tex.
No. 3, Red River	do	25.00	62 0	18 0	2 10	1913	Denison, Tex.
No. 4, Trinity River	do	35.00	66 6	22 0	3 6	1912	Ferris, Tex.
No. 1	32-ton barge	24.00	38 0	14 0	5 0	1902	Port Arthur, Tex.
No. 2	30-ton barge	19.00	32 0	14 0	5 0	1909	do
No. 3	do	24.00	32 0	14 0	5 0	1909	do
No. 4	Scow	26.30	69 4	18 0	4 6	1913	Orange, Tex.
No. 6	do	14.00	40 2	14 0	4 3	1916	Port Arthur, Tex.
"A"	Oil barge	61.00	80 0	20 0	5 6	1916	Galveston, Tex.
4 barges	Scow (each)	....	50 0	24 0	4 9	1916	Lock 8, Brazos River
2 barges	do	....	60 0	30 0	4 9	1916	do

[1] Average.

mployed in the Engineer Department at large on Dec. 31, 1917—Continued.

DALLAS, TEX.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	......	Wood.	$84,333.40	$15,000.00	Poor..	$1,184.07	Improving Sabine Pass, Tex.
......	......	..do..	84,520.00	84,520.00	Good..	3,294.40	Port Arthur Canal, Tex.
......	......	..do..	21,840.00	8,000.00	Fair...	......	Red River, La. and Ark., above Fulton.
......	......	..do..	19,500.00	7,500.00	..do..	......	Trinity River, Tex.
......	......	Steel..	52,000.00	51,000.00	Excellent.	......	Red River, La. and Ark., above Fulton.
......	......	Wood.	6,738.50	4,000.00	Fair...	301.22	Sabine-Neches Canal, Tex.
......	......	..do..	1,000.00	75.00	Poor..	......	Cypress Bayou, Tex. and La.
......	......	..do..	125.00	250.00	Good..	......	Trinity River, Tex.
......	......	..do..	1,121.48	800.00	..do..	71.91	Sabine-Neches and Port Arthur Canals, Tex.
......	......	..do..	315.05	Worthless.	Unserviceable.	......	Red River, La. and Ark., above Fulton.
......	......	..do..	1,105.94	450.00	Fair...	......	Trinity River, Tex.
......	......	Galvanized steel.	1,581.25	Worthless.	Unserviceable.	......	Sabine-Neches Canal, Tex.
......	......	Wood.	4,900.00	4,900.00	Excellent.	54.82	Waterways in vicinity of Port Arthur, Tex.
......	......	..do..	2,500.00	2,100.00	..do..	48.25	Lock and Dam No. 1, Trinity River, Tex.
......	......	..do..	2,168.83	1,500.00	Good..	......	Lock and Dam No. 2, Trinity River, Tex.
......	......	..do..	1,692.90	1,500.00	..do..	......	Lock and Dam No. 4, Trinity River, Tex.
......	......	..do..	2,200.00	1,900.00	Excellent.	......	Lock and Dam No. 6, Trinity River, Tex.
......	......	..do..	2,650.00	2,000.00	Good..	......	Lock and Dam No. 7, Trinity River, Tex.
......	......	..do..	2,758.99	2,200.00	..do..	......	Lock and Dam No. 20 (Hurricane Shoals), Trinity River, Tex.
......	......	..do..	3,159.29	2,200.00	..do..	81.00	Lock and Dam No. 25 (White Rock Shoals), Trinity River, Tex.
......	......	..do..	Unknown.	Worthless.	Unserviceable.	......	Lock and Dam No. 1 Brazos River, Tex.
......	......	..do..	5,360.21	3,000.00	Fair...	43.80	Lock and Dam No. 2, Brazos River, Tex.
......	......	..do..	5,407.40	3,000.00	..do..	24.80	Lock and Dam No. 6, Brazos River, Tex.
......	......	..do..	5,360.25	2,700.00	..do..	83.80	Lock and Dam No. 8, Brazos River, Tex.
1911	Beaumont, Tex.	..do..	750.00	60.00	Poor..	......	Sabine-Neches Canal, Tex.
......	......	..do..	2,458.73	100.00	Bad...	......	Cypress Bayou, Tex.
......	......	..do..	1,305.51	100.00	Poor..	......	Red River, La. and Ark.
......	......	..do..	2,230.36	500.00	Fair...	......	Trinity River, Tex.
1907	Port Arthur, Tex	..do..	Unknown.	15.00	Poor..	......	Port Arthur Canal, Tex.
......	......	..do..	750.00	25.00	..do..	......	Do.
......	......	..do..	750.00	25.00	..do..	......	Do.
......	......	..do..	1,800.00	1,200.00	Good..	......	Do.
......	......	..do..	994.64	800.00	..do..	......	Sabine-Neches and Port Arthur Canals, Tex.
1916	Galveston, Tex..	Steel..	9,960.00	9,960.00	..do..	......	Do.
......	......	Wood.	[1] 2,100.00	2,100.00	..do..	......	Brazos River, Tex.
......	......	..do..	[1] 2,500.00	2,500.00	..do..	......	Do.

NOTE.—The gasoline launch Sextant was dropped on property return for period ending June 23, 1917, The quarterboat No. 1, Trinity River, was dropped on property return for six months ending Sept. 30. 1916. The barge No. 5 (scow) was dropped on property return for period ending June 23, 1917.

TABLE 3.—*Statement of floating plant owned by the United States and*

DETROIT, MICH.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Lydecker, Gen. G. J.	Survey steamer	120.00	125	0	18	3	10	0	1909	Boston, Mass.
Noble, Alfred	do	83.00	76	6	15	6	7	0	1905	Toledo, Ohio.
West Neebish	Tug	47.40	59	6	15	1	6	6	1909	Sault Ste. Marie, Mich.
Sapper	do	59.00	76	4	18	4	9	6	1888	Buffalo, N. Y., rebuilt at Toledo, Ohio.
Custodian	Gasoline launch		23	6	7	3	2	4	1915	St. Clair Flats, Mich.
Don	do	9.00	41	9	9	7	4	7	1904	Detroit, Mich.
Lydecker, Gen. G. J. No. 1.	do		20	6	5	0	2	0	1909	Boston, Mass.
Lydecker, Gen. G. J. No. 2.	do		15	6	4	6	1	9	1909	do
Bug	do	10.00	38	0	10	8	6	2	1911–1912	Detour, Mich.
Iris	do	4.00	28	0	7	0	3	0	1913	St. Joseph, Mich.
(No name)	Derrick scow		76	6	22	0	6	5	1902	Detroit, Mich.
Hay Lake	Quarter boat	106.00	70	0	22	0	4	4	1895	Sault Ste. Marie, Mich.
No. 3	Floating derrick	236.00	50	0	42	0	12	0	1913	Green Bay, Wis.
No. 8	Derrick boat	76.00	80	0	22	0	6	4	1905–1915	Sault Ste. Marie, Mich.
No. 5	Deck scow	55.00	80	0	22	0	6	4	1905	do
No. 6	do	55.00	80	0	22	0	6	4	1907	do
No. 7	do	25.00	50	0	18	0	5	6	1912	do

DETROIT, MICH. (LAKE SURVEY).

Name or number.	Type.	Displacement in long tons.	Length Ft.	in.	Beam Ft.	in.	Depth Ft.	in.	When.	Where.
Surveyor [1]	Survey steamer	176.00	98	0	20	1	8	5	1891	South Haven, Mich.
Lusk, Col. J. L. [2]	do	295.00	123	11	19	4	11	10	1884	Manistee, Mich.
Search [3]	do	200.00	158	6	18	0	10	0	1896	Buffalo, N. Y.
No. 1 [4]	do	56.00	70	1	13	6	6	6	1891	Oshkosh, Wis.
No. 2 [5]	do	48.00	70	3	14	6	7	5	1909	Detroit, Mich.
No. 3 [6]	Motor launch	2.60	22	3	6	3	3	2	1902	St. Joseph, Mich.
No. 4	do	10.00	38	6	11	0	4	2	1905	Detroit, Mich.
No. 5	do	10.00	36	1	9	0	4	0	1909	Manitowoc, Wis.
No. 6	do	10.00	36	0	9	0	4	0	1909	do
No. 8	do	2.40	23	3	6	6½	3	3	1913	Detroit, Mich.
Inspector	do	26.00	50	3	8	9	4	8	1903	Racine, Wis.
Netnokwa [7]	do	10.00	37	0	7	4	5	6		New York City.
No. 1	Catamaran		27	0	21	0	2	0	1898	Detroit, Mich.
No. 2	do		27	0	21	0	2	0	1899	do
No. 3	do		33	6	21	0	2	0	1899	do
No. 1	Sweeping float (2 sections)		30	0	80	0	3	4	1902	Port Huron, Mich.

[1] Formerly Lorain L.
[2] Formerly Gen. Williams.
[3] Formerly Enquirer.
[4] Formerly Gen. G. K. Warren.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

DETROIT, MICH.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When	Where.						
1913	Toledo, Ohio	Wood.	$32,000.00	$18,000.00	Fair	$746.89	Several appropriations for the Detroit, Mich., district.
	Built by United States contract.	Steel	19,800.00	14,000.00	do	1,241.27	Middle and West Neebish Channels, St. Marys River, Mich.
	do	Wood.	7,668.50	7,000.00	Good	5.87	Hay Lake and Neebish Channels, St. Marys River, Mich.
1903	Toledo, Ohio	do	9,500.00	4,000.00	Poor		Harbors at Cheboygan, Alpena, Harbor Beach, Mich., and Saginaw and Black Rivers, Mich.
1915	St. Clair Flats, Mich.	do	436.05	375.00	Good	7.00	St. Clair Flats Canal, Mich.
1907	Detroit, Mich	do	2,170.00	1,250.00	do	4.34	Detroit River, Mich.
1913	Toledo, Ohio	do		350.00	Fair		Part of outfit of U. S. steamer Gen. G. J. Lydecker.
1913	do	do		300.00	do		Do.
1917	Sault Ste. Marie, Mich.	do	1,000.00	800.00	do	113.27	Operating and care of canals, etc., St. Marys Falls Canal, Mich.
1917	do	do	850.00	700.00	Good	97.98	Do.
	Built by United States contract.	do	4,600.00	2,600.00	Fair		Detroit River, Mich.
	do	do	3,300.00	1,200.00	do	9.69	Hay Lake and Neebish Channels, St. Marys River, Mich.
	do	Steel	25,170.00	24,000.00	Good		St. Marys River, Mich. (locks and canals).
	Built by United States.	Wood.	4,000.00	2,500.00	do	603.91	Do.
	do	do	1,600.00	1,100.00	Fair		St. Marys River, Mich.
	do	do	1,500.00	800.00	do		Do.
	do	do	1,020.00	750.00	Good	12.79	Do.

DETROIT, MICH. (LAKE SURVEY).

When	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
1903	Mackinac, Mich.	Wood.	Unknown.	$10.000	Good	$1,354.08	Survey northern and northwestern lakes.
1891	Manistee, Mich	do	do	15.000	do	1,507.56	Do.
1899	Buffalo, N. Y	Steel	do	20,000	do	6,750.56	Do.
1899	Milwaukee, Wis.	Wood.	$6,020.44	1,800	Fair		Do.
		do	Unknown.	2,700	Good		Do.
1902	St. Joseph, Mich.	do	$940.00	150	Poor	4.65	Do.
		do	$1,000.00	700	Good	123.08	Do.
		do	$1,425.00	600	do	25.90	Do.
		do	$1,425.00	600	do	117.92	Do.
		do	$725.00	200	Fair	131.35	Do.
1913	Milwaukee, Wis.	Steel	$5,000.00	1,200	do	210.63	Do.
1916	Sault Ste. Marie, Mich.	Wood.	Unknown.	900	Good	94.11	Do.
1898	Detroit, Mich		$1,248.33	200	Fair		Do.
1899	do		$1,248.33	75	Poor		Do.
1899	do		$1,248.33	75	do		Do.
1902	Port Huron, Mich.		$8,000.00	700	Good		Do.

---

[5] Formerly Fanny H. Compass.

[6] Formerly Stadia.

[7] Formerly Chum.

TABLE 3.—*Statement of floating plant owned by the United States and*

DULUTH, MINN.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Circle	Steam tug	38.00	53 6	14 3	6 6	1885	Buffalo, N. Y
Essayons	do	169.00	85 0	21 0	11 6	1908	Muskegon, Mich.
Sears, Gen. C. B.	Steam survey boat	260.00	110 7¼	22 0	12 0	1915	do
Curve	Gasoline launch	2.00	22 6	5 5	2 7		St. Joseph, Mich
Oskar	do	1.50	20 0	5 1	3 0		
Nemadji	Gasoline tug	20.00	60 9	12 0	6 2	1912	Racine, Wis.
No. 1	Flat scow	48.00	90 0	20 0	6 6		
No. 7	400-ton derrick scow	184.00	102 6	32 0	7 10	1907	Superior Entry, Wis.
No. 8	70-ton derrick scow	40.00	70 0	20 0	5 6	1907	do
No. 10	Pile driver	56.00	60 0	26 0	3 10	1908 1909	do
No. 11	Steel dump scow	280.00	125 8	31 6	12 0	1916	Ferrysburg, Mich
No. 12	do	280.00	125 8	31 6	12 0	1916	do
Gaillard, Col. D. D.	Steel dipper dredge	780.00	116 0	40 0	11 6	1916	Green Bay, Wis.

GALVESTON, TEX.

Name or number.	Type.	Displacement in long tons.	Length.	Beam.	Depth.	When.	Where.
Galveston	Seagoing hopper dredge	3,375.00	304 0	51 0	27 0	1908	Sparrows Point, Md.
Comstock	do	660.00	163 10	35 0	17 0	1915	Baltimore, Md
Sam Houston	Hydraulic pipe-line dredge.	981.00	148 0	38 0	12 0	1915	Galveston, Tex.
Miller, Col. A. M.	do	943.00	138 6	37 0	13 0	1906	do
Guadalupe	do		118 0	29 3	5 11	1908	Victoria, Tex.
Waco	Snag boat	215.00	135 7	30 10	5 0	1910	Jeffersonville, Md.
San Luis	Steam tug (screw)	161.00	121 0	26 0	13 3	1911	Baltimore, Md
Colonel	Gasoline launch (screw).	31.00	66 8	12 6	6 0	1906	New York, N. Y
Hartrick, E. M.	do	42.00	60 0	16 6	5 3	1916	Morehead City, N. C.
Helen	do	35.00	56 0	12 4	5 9	1901	Galveston, Tex.
Bastrop	do	16.00	46 6	11 6	5 0	1908	Cedar Bayou, Tex.
Cavallo	do	12.00	39 10	8 10	5 9	1916	Galveston, Tex.
Victoria	do	11.00	34 0	9 0	5 6	1915	do
Hill	do	7.00	31 5	8 5	4 0	1905	Alta Loma, Tex.
Lavaca	do	4.00	26 0	7 4	4 8	1916	Galveston, Tex.
Mezquite	do	4.00	30 6	8 10	3 10	1916	Wareham, Mass.
Palacios	do	3.00	26 6	7 0	5 6	1916	Galveston, Tex.
Mustang	do	2.50	20 0	5 9	2 5	1916	do
Copano	do	2.00	28 6	7 0	4 5	1916	do
"G"	do	1.50	25 7	8 2	3 6	1908	Camden, N. J.
Commodore	do	1.00	23 4	6 0	3 2	1910	Galveston, Tex.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

DULUTH, MINN.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1903	Duluth, Minn...	Wood.	$2,500.00	$1,600.00	Fair...	$171.29	General repairs, Keweenaw Waterway, Mich.
......	....	Steel..	35,950.00	33,793.00	Good..	1,235.31	General work in district.
......	....	...do...	75,506.00	90,090.00	...do...	1,693.69	Inspection and general work in district.
1897	St. Joseph, Mich.	Wood.	800.00	275.00	Fair...	2.10	Patrol Portage River, Keweenaw Waterway, Mich.
1916	Houghton, Mich.	...do...	250.00	225.00	Good..	2.10	Patrol upper entrance Keweenaw Waterway, Mich.
......	....	...do...	14,000.00	13,020.00	...do...	74.31	Harbor patrol and inspection, Duluth-Superior Harbor.
1903	Duluth, Minn...	...do...	2,000.00	720.00	Fair...	....	Duluth, Minn., district for general repairs.
......	....	...do...	11,907.00	6,787.00	...do...	392.84	Do.
......	....	...do...	4,103.00	2,339.00	Good..	120.88	Repairing breakwaters and revetments, Keweenaw Waterway, Mich.
......	....	...do...	3,918.00	2,500.00	...do...	31.50	Improvement and repairs throughout the district.
......	....	Steel..	25,525.00	25,270.00	Excellent.	10.96	Dredging throughout the district.
......	....	...do...	25,525.00	25,270.00	...do...	64.96	Do.
......	....	...do...	108,184.00	106,920.00	...do...	5,814.03	Do.

GALVESTON, TEX.

......	....	Steel..	$357,500.00	$295,000.00	Good..	$22,838.86	Improving harbor at Galveston, Tex.
......	....	...do...	210,433.68	208,000.00	Excellent.	22,570.93	Improving Port Aransas, Tex., and mouth of Brazos River, Tex.
......	....	Wood.	159,972.50	156,000.00	...do...	31,680.68	Improving Houston Ship Channel, Tex.
......	....	...do...	102,000.00	65,000.00	Good..	31,087.12	Improving Galveston Channel, Tex.
......	....	...do...	58,000.00	49,500.00	...do...	13,380.70	Improving inland waterway on coast of Texas.
......	....	...do...	29,000.00	22,500.00	...do...	74.01	Improving Brazos River, Tex.
1915	Baltimore, Md..	Steel..	78,000.00	95,000.00	Excellent.	1,633.70	Galveston Harbor, Channel, and Houston Ship Channel, Tex.
1912	Jacksonville, Fla.	Wood.	6,500.00	9,000.00	Fair...	2,774.62	All appropriations of this district.
......	....	...do...	13,450.00	12,500.00	Excellent.	1,084.24	Improving Houston Ship Channel, Tex.
......	....	...do...	10,000.00	5,750.00	Good..	1,356.32	Galveston Harbor and Channel and Houston Ship Channel, Tex.
......	....	...do...	4,300.00	2,750.00	...do...	937.92	Inland waterway on coast of Texas.
......	....	...do...	5,911.85	5,750.00	...do...	302.42	Do.
......	....	...do...	2,800.00	2,000.00	Excellent.	545.82	Do.
......	....	...do...	2,000.00	1,300.00	Good..	578.20	Do.
......	....	...do...	1,687.91	1,500.00	...do...	232.60	Improving Houston Ship Channel, Tex.
1916	Wareham, Mass.	...do...	1,794.00	1,700.00	...do...	467.09	All appropriations of this district.
......	....	...do...	1,492.44	1,200.00	...do...	273.21	Improving Galveston Channel, Tex.
......	....	...do...	750.00	600.00	Fair...	280.66	Improving Port Aransas and mouth of Brazos River.
......	....	...do...	1,425.89	1,200.00	Good..	392.69	Improving Houston Ship Channel, Tex.
......	....	...do...	1,250.00	600.00	Fair...	475.04	Improving harbor at Galveston, Tex.
......	....	...do...	884.06	600.00	Good..	32.99	Do.

TABLE 3.—*Statement of floating plant owned by the United States and*

GALVESTON, TEX.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Padre [1]	Gasoline launch (screw).	0.60	22	0	5	0	3	5	1916	Port Aransas, Tex.
Hidalgo	do		28	3	8	3	4	0	1916	Galveston, Tex.
Leslie	do	7.00	36	0	8	6	4	6	1907	New York.
No. 1	Derrick barge	116.00	65	0	27	0	5	6	1908	Galveston, Tex.
No. 2	do	65.00	65	0	26	0	5	0	1915	Victoria, Tex.
No. 4	do	140.00	70	0	26	1	4	10	1902	Galveston, Tex.
No. 1	Quarter boat	81.00	60	8	23	7	7	6	1907	do
No. 1	Barge	65.00	50	0	22	0	7	0	1907	Lockport, La.
No. 3	do	65.00	50	0	22	0	7	0	1907	do
No. 4	Oil and water barge	41.00	50	0	20	0	5	6	1908	Seabrook, Tex.
No. 5	do	144.00	80	0	28	0	8	0	1908	Galveston, Tex.
No. 8	do	250.00	100	0	30	0	10	0	1915	Gulfport, La.
No. 9	do	250.00	100	0	30	0	10	0	1915	do
San Jacinto	Hydraulic pipe-line dredge.	981.00	148	0	38	0	12	0	1915	Galveston, Tex.
San Bernard	do	440.00	83	0	32	0	7	6	1906	do
Talfor, Capt	Steam tug	43.00	80	0	17	0	8	0		Scranton, Miss.

GRAND RAPIDS, MICH.

Name or number.	Type.	Displacement in long tons.	Length.		Beam.		Depth.		When.	Where.
Meade, Gen. G. G	Seagoing hopper dredge.	1,458.00	177	0	38	0	19	0	1904	Sparrows Point, Md.
Saginaw	Bucket dredge	92.00	83	9	28	0	6	7	[2] 1891	Saginaw, Mich.
Gillmore, Gen	Steam tug	[4] 47.00	61	6	15	0	4	10	1906	Grand Haven, Mich.
Hancock	Survey and inspection steamer.	120.00	97	10	17	6	7	6	1890 1906	Saugatuck, Mich. Rebuilt, Detroit, Mich.
Engineer	Gasoline launch	10.00	37	6	7	8	2	2	1902	Grand Rapids, Mich.
Ludington	do	1.47	22	4	5	0	2	4	1909	do
Hancock No. 2	do	2.50	16	0	5	0	2	4	1916	Detroit, Mich.

HONOLULU, HAWAII.

Name or number.	Type.	Displacement in long tons.	Length.		Beam.		Depth.		When.	Where.
Nola	Launch		35	0	7	6	4	6	1911	Seattle, Wash.
Wiki	Flat	84.00	65	0	25	0	6	0	1908	Pearl Harbor, Hawaii.
No. 1 [7]	Anchor scow	29.00	40	0	18	0	4	5		Unknown.
No. 2 [7]	Oil scow	29.00	40	0	18	0	4	5		do
Mae Muat	Launch		30	6	8	4	3	10		do

---

[1] Formerly St. Joseph.
[2] Rebuilt at Grand Haven, Mich., in 1906, from dipper dredge to derrick, at cost of $6,500.
[3] Hull rebuilt and machinery repaired in 1916.
[4] Measured tonnage; displacement not known.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

GALVESTON, TEX.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	$525.00	$500.00	Excellent.	$163.39	Improving Port Aransas, Tex.
......	....	...do...	2,075.00	2,000.00	...do...	269.78	Improving Brazos River, Tex.
1907	New York......	...do...	3,900.00	3,500.00	...do...	1,677.08	All appropriations of this district.
......	....	...do...	8,800.00	3,000.00	Poor..	Nothing.	Improving Houston Ship Channel, Tex.
......	....	...do...	10,642.33	10,000.00	Excellent.	7.35	Improving inland waterway on coast of Texas.
1913	Galveston, Tex..	...do...	3,500.00	3,000.00	Fair...	840.61	Improving Houston Ship Channel, Tex.
......	....	...do...	3,578.22	3,250.00	Excellent.	....	Do.
1907	....	...do...	3,316.00	2,750.00	Good..	....	Improving Port Aransas, Tex.
1907	....	...do...	3,316.00	1,750.00	Fair...	....	Do.
1908	....	...do...	2,015.00	1,500.00	...do...	....	Inland waterway on coast of Texas.
1908	....	...do...	7,500.00	6,000.00	...do...	....	Improving harbor at Galveston, Tex.
1915	....	...do...	8,650.00	8,300.00	Excellent.	....	Improving Houston Ship Channel, Tex.
1915	....	...do...	8,650.00	8,300.00	...do...	....	Do.
1915	....	.. do...	159,922.50	156,000.00	Good..	19,165.85	Do.
1913	....	...do...	29,500.00	29,000.00	Fair...	2,216.86	Improving inland waterway on coast of Texas.
......	....	...do...	12,000.00	10,000.00	Good..	3,982.66	Galveston Harbor and Channel and Houston Ship Channel, Tex.

GRAND RAPIDS, MICH.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
1904	Sparrows Point, Md.	Steel..	$177,953.00	$142,000.00	Good..	$6,825.67	Harbors east shore Lake Michigan.
1891	Saginaw, Mich..	Wood.	[5] 18,000.00	8,000.00	...do...	2,019.63	Grand River, Mich., and Muskegon Harbor, Mich.
(7)	(7)..............	...do...	5,452.69	1,200.00	Fair...	238.40	Do.
1890	Saugatuck, Mich..	...do...	[6] 10,000.00	10,000.00	Good..	620.30	Harbors east shore Lake Michigan.
......	....	Wood.	1,600.00	600.00	Good..	48.61	Manistee Harbor, Mich.
1909	Grand Rapids, Mich.	...do...	426.00	200.00	...do...	101.23	Grand Haven Harbor, Mich.
1916	Detroit, Mich...	...do...	207.28	200.00	...do...	....	Harbors east shore Lake Michigan.

HONOLULU, HAWAII.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
1911	Seattle, Wash...	Wood.	$2,860.00	$2,000.00	Good..	....	River and harbor works.
......	....	...do...	2,000.00	1,000.00	...do...	$353.21	Fortification works.
1912	Honolulu, Hawaii.	...do...	150.00	200.00	Poor..	Nothing.	Do.
1912	.....do..........	...do...	150.00	500.00	Good..	Nothing.	Do.
1916	.....do..........	...do...	200.00	800.00	Fair...	225.00	Do.

[5] Purchased in Chicago, 1889, for $7,500. Nothing of this boat except the boiler used when rebuilt in 1906.

[6] Extensive repairs made to hull in 1916.

[7] Acquired by terms of 4-month lease, at the expiration of which the scows became the property of the United States.

TABLE 3.—*Statement of floating plant owned by the United States and*

JACKSONVILLE, FLA.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Barnard	Self-propelling pipe-line dredge.	1,291.00	198	8	38	0	14	0	1904	Camden, N. J
Mallery, Maj. J. C.[1]	Hydraulic pipe-line dredge	666.00	130	0	32	0	9	0	1913	Baltimore, Md
Sarasota	.....do	181.00	77	1	29	6	5	0	1915	Tampa, Fla
Florida	Self-propelling pipe-line dredge.	371.00	152	0	29	9	7	0	1904–5	Jacksonville, Fla
Kissimmee	Snag boat	65.00	60	0	18	0	4	0	1903	Kissimmee, Fla
Key West	Seagoing hopper dredge	1,000.00	142	0	31	7	14	8	1904	Belfast, Me
Maguire, Captain[2]	Gasoline motor snag boat.	49.00	67	0	17	7	4	0	1897	Palatka, Fla
Meyler, Capt. J. J	Motor survey boat	43.20	70	6	15	0	7	8	1912	Port Clinton, Ohio
De Soto[3]	.....do	14.00	63	2	10	7	5	1	1905	New York, N. Y
D'Armit	.....do	4.30	35	0	8	3	4	6	1913	Racine, Wis
Sirius[4]	Motor launch	5.00	32	0	8	0	3	0	1911	Jacksonville, Fla
Violetta	.....do	8.00	34	0	11	4	3	0	1892	Brooklyn, N. Y
Corvi[5]	.....do	.45	18	0	4	10	3	0	1904	Belfast, Me
Chica[6]	.....do	.35	19	6	5	5	3	2	1904	.....do
Nassau	.....do	1.20	23	10	7	1	3	10	1916	Dames Point, Fla
Alafia	.....do	.65	18	0	5	10	2	1	1914	South Jacksonville, Fla.
Freak	.....do	2.50	28	0	8	0	3	0	1909	Bradentown, Fla
Tocoi	.....do	.24	16	10	4	1	1	9	1913	Salem, Ohio
Hyacinth elevator No. 2.	Pontoon catamaran with elevator.	42.00	40	0	28	0	5	0	1916	Dunnellon, Fla
No. 1	Barge	51.00	66	0	22	0	6	0	1911	Jacksonville, Fla
No. 2	.....do	51.00	66	0	22	0	6	0	1911	.....do
No. 3	.....do	50.50	65	0	22	0	6	0	1913	.....do
No. 4	.....do	50.50	65	0	22	0	6	0	1913	.....do
S. 1	.....do	31.00	50	0	17	0	5	0	1915	Tampa, Fla
B. 2	.....do	50.50	65	0	22	0	6	0	1914	.....do
B. 3	.....do	50.50	65	0	22	0	6	0	1914	.....do
B. 4	.....do	50.50	65	0	22	0	6	0	1916	.....do
B. 5	.....do	31.00	50	0	17	0	5	0	1916	.....do
H. B. 1	Barge quarterboat	39.90	45	0	15	0	4	0	......	No record.
M. 5	Barge derrick	20.20	39	0	14	0	4	0	......	.....do

KANSAS CITY, MO.

Name or number.	Type.	Displacement in long tons.	Length.		Beam.		Depth.		When.	Where.
Augustin No. 1	Skiff	....	20	0	5	4	1	10	1911	Dubuque, Iowa
Augustin No. 2	.....do	....	20	0	5	4	1	10	1911	.....do
Augustin, Lieut	Sternwheel towboat	191.00	136	0	25	6	5	0	1911	.....do
Baldwin, Edwin M.	.....do	191.00	137	9	25	3	5	0	1917	Gasconade, Mo
Bonne Femme[9]	Motor launch	....	24	8	5	6	2	5	1908	Grafton, Ill

---

[1] And dredge Jacksonville, estimated value, $20,000, in exchange.
[2] Formerly steamer La Reve.
[3] Formerly motor boat Gunedmetrix.
[4] Destroyed by fire Mar. 16, 1917.
[5] Formerly lifeboat on U. S. dredge Key West.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

JACKSONVILLE, FLA.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Steel..	$230,000.00	$145,000.00	Good..	$30,512.40	Hillsboro Bay, Fla.
1913	Baltimore, Md..	...do...	[1] 74,000.00	82,500.00	...do...	34,064.11	St. Johns River, Fla.
......	....	...do...	20,093.00	19,500.00	...do...	2,688.46	Caloosahatchee and Manatee River inland waterways, west coast of Florida.
......	....	...do...	80,000.00	67,000.00	...do...	3,596.46	St. Johns River and tributaries, inland waterways, east coast of Florida.
......	....	Wood.	4,000.00	700.00	Poor..	....	Caloosahatchee and Kissimmee Rivers.
......	....	...do...	91,000.00	58,000.00	Good..	22,855.22	St. Johns River, Fla.
1902	Palatka, Fla....	...do...	5,000.00	1,800.00	...do...	733.83	Removal of snags and hyacinth, St. Johns River and tributaries.
......	....	...do...	17,431.14	14,000.00	...do...	2,959.34	Inspection of waterways, east coast of Florida.
1911	New York, N.Y.	...do...	7,500.00	5,000.00	...do...	646.95	Inspection of waterways, west coast of Florida.
1913	Racine, Wis.....	...do...	1,880.00	1,400.00	...do...	413.03	Inspection of St. Johns River, Jacksonville to the ocean.
......	....	...do...	1,500.00	Nothing.	(4) ...	....	Tender to U. S. dredge Florida.
......	No record.......	...do...	1,000.00	500.00	Poor..	401.50	Tender to U. S. dredge Barnard.
......	....	...do...	(5)	50.00	Fair...	....	Survey boat on Hillsboro Bay, Fla.
......	....	...do...	[6] 140.00	250.00	Good..	117.50	Motor tender, U. S. dredge Key West.
......	....	...do...	397.14	500.00	...do...	84.05	Surveys St. Johns River, Jacksonville to the ocean.
......	....	...do...	479.00	475.00	...do...	46.13	Tender to U. S. dredge Sarasota.
......	....	...do...	530.00	225.00	Fair...	....	Tender to U. S. snag boat Kissimmee.
1913	Salem, Ohio.....	Steel..	137.00	80.00	Good..	....	Tender to U. S. power boat Captain J. J. Meyler.
......	....	Wood.	3,799.65	3,500.00	...do...	36.84	Hyacinth removal, Withlacoochee River, Fla.
1913	Jacksonville, Fla.	...do...	800.00	800.00	...do...	....	St. Johns River, Fla.
1913	.....do..........	...do...	800.00	800.00	...do...	968.02	Do.
......	....	...do...	1,395.00	1,500.00	...do...	502.67	Do.
......	....	...do...	1,395.00	1,500.00	...do...	481.92	Do.
......	....	...do...	1,250.00	1,200.00	...do...	....	Hillsboro Bay, Fla., attending dredge Barnard.
......	....	...do...	1,750.00	1,600.00	...do...	....	Do.
......	....	...do...	1,750.00	1,600.00	...do...	....	Do.
......	....	...do...	1,938.00	1,938.00	...do...	....	Do.
......	....	...do...	1,390.00	1,390.00	...do...	46.90	Waterways west coast of Florida, attending dredge Sarasota.
1906	Stuart, Fla......	...do...	125.00	50.00	Poor..	....	Hillsboro Bay, Fla.
1916	Jacksonville, Fla.	...do...	500.00	500.00	Good..	410.45	St. Johns River, attending dredge Major J. C. Mallery.

KANSAS CITY, MO.

1911	Dubuque, Iowa.	Steel..	(7)	36.50	Fair...	....	Lower Missouri River.
1911	.....do..........	...do...	(7)	36.50	...do...	....	Do.
1911	.....do..........	...do...	34,888.70	22.000.00	...do...	1,330.70	Do.
......	(9).............	...do...	31,383.63	31,000.00	Good..	213.24	Do.
1908	Grafton, Ill......	...do...	484.00	475.00	...do...	384.75	Do.

---

[6] Part of life-saving equipment dredge Key West hull rebuilt in 1916 at a cost of $140.
[7] Included in contract price for steel towboat.
[8] Built by United States Engineer Department.
[9] Formerly the Missouri.

TABLE 3.—*Statement of floating plant owned by the United States and*

KANSAS CITY, MO.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Bon Homme	Motor launch		21	7	4	11	2	6	1916	Gasconade, Mo
Boone, Daniel	Sternwheel towboat	86.00	117	6	22	7½	4	0	1913	do
Bonneville	do	93.00	127	8	22	9	4	0	1915	Sioux City, Iowa
C	Quarterboat	48.00	100	0	20	0	4	0	1915	Gasconade, Mo
Charette	Motor launch		30	0	5	6	3	0	1917	St. Paul, Minn
Chariton	do	1.00	24	0	5	0	1	10	1914	Gasconade, Mo
Enquirer	do		30	4	7	0	3	0	1897	Long Island City, N. Y.
Flirt	do	1.00	23	7	5	4	2	4	1917	Gasconade, Mo
Gasconade	Skiff		12	0	3	4			1911	Grafton, Ill
Gasconade	Sternwheel towboat (gasoline).	13.00	59	2	12	6	2	6	1911	Gasconade, Mo
Gurney No. 1	Skiff		20	0	5	4	1	10	1911	Dubuque, Iowa
Gurney No. 2	do		20	0	5	4	1	10	1911	do
Gurney, Lieut	Sternwheel towboat	191.00	136	0	25	6	5	0	1911	do
Hurricane	Motor launch	1.50	24	2	5	4	1	10	1915	Gasconade, Mo
Katherine No. 1	Skiff		16	0					1912	Grafton, Ill.
Katherine No. 2	do		16	0					1912	do
Katherine No. 3	do		18	0	4	6	1	3	1913	Kansas City, Mo
Katherine	Sternwheel survey boat (gasoline).	55.00	86	4	22	0	3	0	1912	Gasconade, Mo
Keith, George G	Sternwheel towboat	94.00	127	8	22	9	4	0	1914	do
Lewis No. 1	Skiff		20	0	5	4	1	10	1911	Dubuque, Iowa
Lewis No. 2	do		20	0	5	4	1	10	1911	do
Lewis, Lieut	Sternwheel towboat	191.00	136	0	25	6	5	0	1911	do
Mandan	Sternwheel snagboat	150.00	156	0	24	0	4	7	1891	St. Louis, Mo
McGregor, Robert	Hydraulic pipe-line dredge.	700.00	206	9	44	4	7	0	1913–14	Dubuque, Iowa
McPherson No. 2	Skiff		20	0	4	4	1	5	1899	Stillwater, Minn
McPherson No. 3	Yawl		26	0	6	4	1	7	1895	Jeffersonville, Ind
McPherson, James B.	Sternwheel snagboat	340.00	194	0	36	0	5	7	1891	Dubuque, Iowa
Missouri [3]	Sidewheel snagboat	510.00	187	0	52	0	7	0	1888	Pittsburgh, Pa
Missouri	Yawl		26	0	5	0	1	9	1907	New York, N. Y
Moniteau	Motor launch	1.00	24	0	5	0	1	10	1914	Gasconade, Mo
Moreau	do		20	0	5	1	2	1	1910	Grafton, Ill
Niangua	do		30	0	6	0	3	6	1917	St. Paul, Minn
Osage [4]	Sternwheel towboat	39.00	68	8	15	1	3	2	1897	Great Falls, Mont
Racket	Motor launch	1.00	22	6	4	7	1	7	1910	Lock and Dam No. 1, Osage River.
Sioux [6] [7]	do		20	0	5	0	2	3	1909	Grafton, Ill
Taber, H. S	Hydraulic pipe-line dredge.	754.00	206	9	44	4	7	0	1913–14	Dubuque, Iowa
Tamerlane	Motor launch		30	0	6	0	3	6	1917	St. Paul, Minn
Terrapin	do	1.00	23	7	5	4	2	4	1917	Gasconade, Mo
Tomahawk	do		22	6	5	6	2	4	1915	do
Wakenda	do	1.00	24	0	5	0	1	10	1914	do
Wild Horse	do	1.00	24	0	5	0	1	10	1914	do
Z	Quarterboat	72.00	90	0	20	0	4	0	1914	Lock and Dam No. 1, Osage River.
B1-14	Barge,	50.00	100	0	26	0	5	0	1914	Batesville, Ark
1	do	53.00	100	0	25	0	4	0	1911	Gasconade, Mo
1	Dredge	120.00	92	0	32	0	4	4	1911	Lock and Dam No. 1, Osage River.
1	Mattress boat	49.00	80	0	30	0	4	0	1909	Gasconade, Mo
1-B	Pile driver	25.00	56	0	18	0	4	4	1895	Bismarck, N. Dak
1	do	61.00	76	0	19	0	4	4	1909	Gasconade, Mo
1	Pile sinker		80	0	24	0	4	4	1915	Batesville, Ark
1	Power boat	36.00	70	0	18	0	4	0	1897	Gasconade, Mo
1	Quarterboat	54.00	100	0	20	0	5	0	[8] 1910 1913	Rock Island, Ill Gasconade, Mo.[9]
I-B	Skiff		18	0	4	4	1	7	1895	Stillwater, Minn
1	do		20	0	5	6	2	0	1913	Gasconade, Mo
2	Mattress barge	40.00	80	0	30	0	4	0	1909	do
2	Pile sinker		80	0	24	0	4	4	1915	Batesville, Ark
2	Quarterboat	54.00	100	0	20	0	5	0	[8] 1910 [9] 1912	Rock Island, Ill.[8] Gasconade, Mo.[9]
2	Skiff		19	10	3	0	1	6		Lock and Dam No. 1, Osage River.
B3-14	Barge		100	0	26	0	5	0	1914	Batesville, Ark
III-S	do	44.00	70	0	20	0	5	0	1897	Sioux City, Iowa

---

[1] Built by United States Engineer Department.
[2] Included in contract price for steel towboat.
[3] Formerly the C. R. Suter.
[4] Formerly the H. M. Roberts.

mployed in the Engineer Department at large on Dec. 31, 1917—Continued.

KANSAS CITY, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	(1)...............	Wood.	$241.43	$200.00	Good..	$176.67	Lower Missouri River.
......	(1)...............	...do...	12,103.40	8,900.00	Fair...	3,323.99	Do.
......	(1)...............	...do...	17,933.89	11,000.00	Good..	1,183.70	Upper Missouri River.
......	(1)...............	...do...	3,852.46	3,100.00	Fair...	....	Gasconade River.
1917	St. Paul, Minn...	...do...	1,490.00	1,450.00	Good..	70.55	Lower Missouri River.
......	(1)...............	...do...	286.62	200.00	Fair...	116.07	Do.
1897	Long Island City, N. Y.	...do...	2,300.00	100.00	Bad...	25.70	Osage River.
......	(1)...............	...do...	597.58	550.00	Good..	36.50	Lower Missouri River.
1911	Grafton, Ill......	Steel..	22.00	10.00	Fair...	....	Gasconade River.
......	(1)...............	Wood.	2,675.00	1,350.00	...do...	749.18	Lower Missouri River.
1911	Dubuque, Iowa.	Steel..	(2)	20.00	...do...	....	Do.
1911	.....do..........	...do...	(2)	20.00	...do...	....	Do.
1911	.....do..........	...do...	34,888.70	22,000.00	...do...	2,125.65	Do.
......	(1)...............	Wood.	269.10	550.00	Good..	496.04	Do.
1912	Grafton, Ill......	Steel..	45.00	25.00	...do...	....	Do.
1912	.....do..........	...do...	45.00	25.00	...do...	....	Do.
1913	Kansas City, Mo.	Wood.	18.00	8.00	Fair...	....	Do.
......	(1)...............	...do...	8.363.44	6,100.00	...do...	742.20	Do.
......	(1)...............	...do...	14,871.50	11,300.00	...do...	722.33	Do.
1911	Dubuque, Iowa.	Steel..	(2)	10.00	Poor..	....	Do.
1911	.....do..........	...do...	(2)	25.00	Fair...	....	Do.
1911	.....do..........	...do...	34,888.70	22,000.00	Good..	1,968.69	Do.
1891	St. Louis, Mo...	...do...	21,500.00	12,000.00	Fair...	359.65	Upper Missouri River.
1913	Dubuque, Iowa.	...do...	182,964.37	160,000.00	Good..	247.60	Lower Missouri River.
1899	Stillwater, Minn.	Wood.	42.00	25.00	Fair...	....	Upper Missouri River.
1895	Jeffersonville, Ind.	Steel..	160.00	36.00	...do...	....	Do.
1891	Dubuque, Iowa.	...do...	45,500.00	21,000.00	...do...	8,099.94	Do.
1888	Pittsburgh, Pa.	...do...	115,000.00	82,000.00	...do...	4,612.46	Lower Missouri River.
1907	New York, N. Y.	...do...	250.00	130.00	...do...	....	Do.
......	(1)...............	Wood.	286.62	175.00	...do...	122.38	Do.
1910	Grafton, Ill......	Steel..	388.50	200.00	Good..	....	Upper Missouri River.
1917	St. Paul, Minn..	Wood.	1,490.00	1,300.00	...do...	121.22	Lower Missouri River.
......	(1)...............	...do...	2.500.00	3,000.00	Fair...	1,612.58	Osage River.
......	(1)...............	...do...	[5] 200.00	150.00	...do...	8.53	Do.
1909	Grafton, Ill......	Steel..	387.00	75.00	Poor..	36.14	Upper Missouri River.
1913	Dubuque, Iowa.	...do...	182,964.37	160,000.00	Good..	4.40	Lower Missouri River.
1917	St. Paul, Minn..	Wood.	1,490.00	1,372.11	...do...	30.25	Do.
......	(1)...............	...do...	597.57	550.00	...do...	6.63	Do.
......	(1)...............	...do...	384.20	200.00	Fair...	7.80	Do.
......	(1)...............	...do...	286.62	225.00	...do...	148.35	Do.
......	(1)...............	...do...	286.62	550.00	Good..	774.68	Do.
......	(1)...............	...do...	3,254.68	2,500.00	...do...	....	Osage River.
......	(1)...............	...do...	2.831.30	2,500.00	...do...	....	Lower Missouri River.
......	(1)...............	...do...	2,300.00	1.500.00	...do...	....	Gasconade River.
......	(1)...............	...do...	4,500.00	3,000.00	Fair...	263.26	Osage River.
......	(1)...............	...do...	1,974.42	1,400.00	...do...	22.10	Lower Missouri River.
......	(1)...............	...do...	2,500.00	900.00	Poor..	....	Upper Missouri River.
......	(1)...............	...do...	[8] 1,500.00	750.00	...do...	201.87	Lower Missouri River.
......	(1)...............	...do...	5.461.21	4.200.00	Good..	....	Do.
......	(1)...............	...do...	3,000.00	1.600.00	Fair...	19.09	Gasconade River.
1910	Rock Island, Ill.	...do...	[8] 1,500.00	2.250.00	...do...	2,389.07	Lower Missouri River.
......	(1)...............	...do...	[9] 2,900.00	....	....	....	
1895	Stillwater, Minn.	...do...	45.00	10.00	Poor..	....	Upper Missouri River.
......	(1)...............	...do...	....	40.00	Good..	....	Lower Missouri River.
......	(1)...............	...do...	1,974.42	100.00	Bad...	25.00	Upper Missouri River.
......	(1)...............	...do...	5,461.21	4,200.00	Good..	....	Lower Missouri River.
1910	Rock Island, Ill.	...do...	[8] 1,500.00	3,200.00	...do...	340.97	Do.
1912	Gasconade, Mo.[1]	...do...	[9] 3,786.60	....	....	....	
......	(1)...............	...do...	No record.	....	Bad...	....	Osage River.
......	(1)...............	...do...	2,831.30	2,500.00	Fair...	....	Lower Missouri River.
(10)	(1)...............	...do...	625.00	1.150.00	Good..	365.07	Do.

[5] Estimated.
[6] Recovered as salvage.
[7] Formerly the McPherson.
[8] Hull.
[9] Quarters.
[10] Rebuilt 1913.

TABLE 3.—*Statement of floating plant owned by the United States*

KANSAS CITY, MO.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions. Length. Ft. in.	Dimensions. Beam. Ft. in.	Dimensions. Depth. Ft. in.	Built. When.	Built. Where.
3	Barge	10.00	42 0	14 0	3 0	1905	Lock and Dam No. 1, Osage River.
3	Mattress barge	49.00	80 0	30 0	4 0	1912	Gasconade, Mo
3	Pile driver	63.00	76 0	19 0	4 4	1914	do
3	Quarterboat	54.00	100 0	20 0	5 0	[3] 1910 [4] 1912	Rock Island, Ill.[1] Gasconade, Mo
3	Skiff		16 1	2 7	1 4		Lock and Dam No. 1, Osage River.
B4-14	Barge		100 0	26 0	5 0	1914	Batesville, Ark
IV-EP	do		70 0	19 10	5 0	[5] 1899	Sioux City, Iowa
IV-S	do		65 0	19 0	4 6	1897	do
4	do	31.00	72 0	20 0	4 0	1905	Osage River
4	Mattress barge	49.00	80 0	30 0	4 0	1912	Gasconade, Mo
4	Pile driver	63.00	76 0	19 0	4 4	1914	do
4	Quarterboat	72.00	90 0	20 0	5 0	1914	do
4	Skiff		16 2	2 6	1 4		Lock and Dam No. 1, Osage River.
V-Y	Barge		64 0	16 0	3 0	1899	Sioux City, Iowa
5	Mattress barge	40.00	80 0	30 0	4 0	1914	Gasconade, Mo
5	Pile driver	56.00	76 0	19 0	4 6	1914	do
5	Quarterboat	72.00	90 0	20 0	5 0	1914	do
5	Skiff		18 0	2 10	1 4	1915	Lock and Dam No. 1, Osage River.
6	Barge		72 0	20 0	4 0	1909	do
6	Mattress barge	49.00	80 0	30 0	4 0	1914	Gasconade, Mo
6	Pile driver	56.00	76 0	19 0	4 6	1914	do
6	Pontoon	3.00	32 0	8 0	3 0	1914	do
6	Quarterboat	84.00	100 0	20 0	5 0	1914	do
6	Skiff		18 9	4 6		1915	do
VII-P	Barge	30.00	70 0	20 0	4 4	1897	Pierre, S. Dak
7	Mattress barge	49.00	80 0	30 0	4 0	1914	Gasconade, Mo
VII-Y	Pile driver [6]	91.00	76 0	19 0	4 4	1912	Sioux City, Iowa
7	Quarterboat	84.00	100 0	20 0	5 0	1914	Gasconade, Mo
7	Skiff		20 0	4 6		1915	do
8	Mattress barge	49.00	80 0	30 0	4 0	1917	do
8	Pile driver		76 0	19 0	4 4	1917	do
8	Quarterboat	84.00	100 0	20 0	5 0	1914	do
8	Skiff		19 0	4 8		1914	do
IX-B	Barge	35.00	80 0	20 0	4 0		No record
9	Mattress barge		80 0	30 0	4 0	1917	Gasconade, Mo
9	Pile driver		76 0	19 0	4 0	1917	do
9	Quarterboat	50.00	100 0	20 0	4 0	1915	do
X-B	Barge	33.00	80 0	20 0	4 0		No record.
10	Skiff		22 0	5 1		1914	Gasconade, Mo
11	do		20 0	4 7	1 3	1914	do
12	Pontoon	2.00	19 6	8 0	2 0	1909	do
12	Skiff		20 0	4 7	1 3	1914	do
13	Pontoon	2.00	19 6	8 0	2 0	1909	do
13	Skiff		16 0	3 9	1 2	1914	do
14	Mattress barge	49.00	80 0	30 0	4 0	1894	do
14	Skiff		16 0	3 9	1 2	1914	do
15	Pile driver [6]	86.00	76 0	19 0	4 4	1883	St. Louis, Mo
15	Pontoon	2.00	20 0	7 0	3 0	1914	Gasconade, Mo
16	do	2.00	20 0	7 0	3 0	1914	do
17	do	2.00	20 0	7 0	3 0	1914	do
18	do	2.00	20 0	7 0	3 0	1914	do
19	do	2.00	20 0	7 0	3 0	1914	do
20	do	2.00	20 0	7 0	3 0	1914	do
21	do	2.00	20 0	7 0	3 0	1914	do
22	do	2.00	20 0	7 0	3 0	1914	do
23	do	1.50	20 0	5 4	1 0	1914	Sioux City, Iowa
24	do	1.50	20 0	5 4	1 4	1914	do
25	Pile driver	75.00	68 0	20 0	3 1½	1893	St. Louis, Mo
28	Pontoon	2.00	20 10	7 0	3 0	1914	Gasconade, Mo
29	do	2.00	20 10	7 0	3 0	1914	do
30	do	2.00	20 10	7 0	3 0	1914	do

[1] Built by United States Engineer Department.
[2] First cost revised.
[3] Hull.
[4] Quarters.
[5] Rebuilt 1913.
[6] Estimated.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

KANSAS CITY, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	(1)...............	Wood.	$937.00	$400.00	Fair...	....	Osage River.
......	(1)...............	...do...	[2] 2,037.03	1,000.00	Poor..	113.02	Lower Missouri River.
......	(1)...............	...do...	3,020.07	2,500.00	Good..	336.19	Do.
1910	Rock Island, Ill.	...do...	[3] 1,500.00	3,600.00	...do...	129.50	Do.
......	(1)...............	...do...	[4] 3,959.00	....	....	....	
......	(1)...............	...do...	No record.	....	Bad...	....	Osage River.
......	(1)...............	...do...	2.831.30	2,200.00	Good..	....	Lower Missouri River.
......	(1)...............	...do...	[6] 840.00	2,400.00	...do...	....	Do.
......	(1)...............	...do...	[8] 625.00	....	Bad...	....	Upper Missouri River.
......	(1)...............	...do...	937.00	600.00	Poor..	....	Osage River.
......	(1)...............	...do...	[3] 1,746.96	1,400.00	Fair...	443.92	Lower Missouri River.
......	(1)...............	...do...	3 069.50	2,500.00	...do...	674.03	Do.
......	(1)...............	...do...	4,084.12	3,600.00	Good..	31.03	Do.
......	(1)...............	...do...	No record.	15.00	Fair...	....	Osage River.
......	(1)...............	...do...	840.00	....	Bad...	....	Upper Missouri River.
......	(1)...............	...do...	2,110.64	1,500.00	Fair...	29.10	Lower Missouri River.
......	(1)...............	...do...	5,531.91	3,825.00	Good..	98.21	Do.
......	(1)...............	...do...	3,093.45	3,300.00	...do...	30.10	Do.
......	(1)...............	...do...	37.68	25.00	...do...	....	Osage River.
......	(1)...............	...do...	[7] 1,200.00	....	Bad...	....	Do.
......	(1)...............	...do...	2,105.91	1,300.00	Good..	305.95	Lower Missouri River.
......	(1)...............	...do...	5,668.74	4,000.00	...do...	193.69	Do.
......	(1)...............	...do...	114.85	45.00	Fair...	....	Do.
......	(1)...............	...do...	6,791.98	4,900.00	Good..	27.85	Do.
......	(1)...............	...do...	No record.	15.00	Fair...	....	Do.
......	(1)...............	...do...	720.00	140.00	Poor..	....	Upper Missouri River.
......	(1)...............	...do...	2,094.85	1,600.00	Fair...	114.06	Lower Missouri River.
......	(1)...............	...do...	2,690.00	2,000.00	...do...	2,061.91	Do.
......	(1)...............	...do...	6,958.78	4,800.00	...do...	....	Do.
......	(1)...............	...do...	No record.	25.00	...do...	....	Do.
......	(1)...............	...do...	2,427.17	2,427.17	Good..	....	Do.
......	(1)...............	...do...	5,654.24	5,654.24	...do...	176.07	Do.
......	(1)...............	...do...	7,043.68	5,000.00	...do...	....	Do.
......	(1)...............	...do...	No record.	15.00	Fair...	....	Do.
1906	Bismarck, N. Dak	...do...	532.00	....	Bad...	....	Upper Missouri River.
......	(1)...............	...do...	2,580.76	2,580.76	Good..	....	Lower Missouri River.
......	(1)...............	...do...	4,550.60	4,550.60	...do...	....	Do.
......	(1)...............	...do...	4,167.49	3,100.00	...do...	....	Do.
1906	Bismarck, N. Dak	...do...	532.00	....	Bad...	....	Upper Missouri River.
......	(1)...............	...do...	No record.	20.00	Fair...	....	Lower Missouri River.
......	(1)...............	...do...	45.00	25.00	...do...	....	Do.
......	(1)...............	...do...	73.00	15.00	Poor..	....	Do.
......	(1)...............	...do...	45.09	10.00	Fair...	....	Do.
......	(1)...............	...do...	73.00	10.00	Poor..	....	Do.
......	(1)...............	...do...	38.27	25.00	Good..	....	Do.
......	(1)...............	...do...	1,200.00 1,922.4[illegible]	1,000.00	Fair...	....	Do.
......	(1)...............	...do...	38.27	25.00	Good..	....	Do.
1883	St. Louis, Mo...	...do...	[9] 1,980.00 [10] 2,000.00	1,300.00	Fair...	10.00	Do.
......	(1)...............	...do...	107.41	20.00	Bad...	....	Do.
......	(1)...............	...do...	107.41	20.00	...do...	....	Do.
......	(1)...............	...do...	107.41	20.00	...do...	....	Do.
......	(1)...............	...do...	107.41	35.00	Fair...	....	Do.
......	(1)...............	...do...	107.41	25.00	...do...	....	Do.
......	(1)...............	...do...	107.41	35.00	...do...	....	Do.
......	(1)...............	...do...	107.41	35.00	...do...	....	Do.
......	(1)...............	...do...	107.41	30.00	...do...	....	Do.
......	(1)...............	...do...	No record.	25.00	...do...	....	Upper Missouri River.
......	(1)...............	...do...	No record.	30.00	...do...	....	Do
1893	St Louis, Mo...	...do...	3,590.00	1,700.00	...do...	63.02	Lower Missouri River.
......	(1)...............	...do...	75.15	30.00	...do...	....	Do.
......	(1)...............	...do...	75.15	25.00	...do...	....	Do.
......	(1)...............	...do...	75.15	20.00	Poor..	....	Do.

[7] Not including machinery.

[8] Piledriver and grader combined.

[9] Cost of hull.

[10] Cost of old machinery used.

TABLE 3.—*Statement of floating plant owned by the United States and*

KANSAS CITY, MO.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
31	Pontoon	2.00	20	10	7	0	3	0	1914	Gasconade, Mo
32	do	1.50	22	0	7	0	3	0	1916	do
33	do	1.50	22	0	7	0	3	0	1916	do
34	do	1.50	22	0	7	0	3	0	1916	do
34	Pile driver	75.00	68	0	20	0	3	1	1893	St. Louis, Mo
35	Pontoon	1.50	19	6	7	0	2	10	1916	Gasconade, Mo
36	do	1.50	19	6	7	0	2	10	1916	do
37	do	1.50	25	6	6	6	2	2	1916	Glasgow, Mo
38	do	1.67	30	0	6	6	2	9	1916	Lupus, Mo
39	do	1.50	22	0	7	0	3	0	1916	Gasconade, Mo
40	do	1.50	22	0	7	0	3	0	1916	Lupus, Mo
41	do	1.00	18	0	8	0	1	4	1916	Freeburg, Mo
75	Skiff		20	0	4	4	1	6	1909	Gasconade, Mo
76	do		20	0	4	4	1	6	1909	do
80	do		20	0	5	0	1	6	1914	do
81	do		20	0	5	0	1	6	1914	do
82	do		20	0	5	0	1	6	1914	do
83	do		20	0	5	0	1	6	1914	do
84	do		20	0	5	0	1	6	1914	do
85	do		20	0	5	0	1	6	1914	do
86	do		16	0	4	3	1	4	1914	do
87	do		16	0	4	3	1	4	1914	do
88	do		20	0	5	0	1	6	1914	do
89	do		20	0	5	0	1	6	1914	do
90	do		16	0	4	3	1	4	1914	do
91	do		20	0	5	0	1	6	1914	do
92	do		16	0	4	3	1	4	1914	do
93	do		16	0	4	3	1	4	1914	do
94	do		16	0	4	3	1	4	1914	do
95	do		20	0	5	0	1	6	1914	do
96	do		20	0	4	7	1	3	1915	do
97	do		20	0	4	7	1	3	1915	do
98	do		20	0	4	7	1	3	1915	do
99	do		20	0	4	7	1	3	1915	do
100	do		16	0	3	9	1	2	1915	do
101	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
101	Skiff		18	0					1910	Stillwater, Minn
102	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
103	do		47	6	12	0	3	0	1914	do
103	Skiff		17	0	4	5	1	4	1912	Folsom, Iowa
104	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
104	Skiff		19	0	4	6	1	6	1913	Sioux City, Iowa
105	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
105	Skiff		20	0	4	6	1	6	1913	Sioux City, Iowa
106	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
106	Skiff		20	0	4	6	1	6	1913	Sioux City, Iowa
107	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
107	Skiff		20	0	4	6	1	6	1913	Sioux City, Iowa
108	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
108	Skiff		20	0	4	6	1	6	1913	Sioux City, Iowa
109	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
109	Skiff		20	0	4	6	1	6	1913	Sioux City, Iowa
110	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
110	Skiff		20	0	4	6	1	6	1913	Sioux City, Iowa
111	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
111	Skiff		19	0	4	6	1	6	1913	Sioux City, Iowa
112	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
112	Skiff		20	0	4	6	1	6	1913	Sioux City, Iowa
113	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
113	Skiff		16	0	4	0	1	3	1913	Sioux City, Iowa
114	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
114	Skiff		20	0	4	6	1	6	1913	Sioux City, Iowa
115	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
115	Skiff		20	0	3	6	1	3	1915	Sioux City, Iowa
116	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
116	Skiff		18	0	4	0	1	6	1915	Sioux City, Iowa
117	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
117	Skiff		20	0	4	0	1	6	1915	Sioux City, Iowa
118	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa
118	Skiff		20	0	5	0	1	2	1916	Gasconade, Mo
119	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa

---

[1] Built by United States Engineer Department.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

KANSAS CITY, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
	(1)	Wood.	$75.15	$20.00	Poor		Lower Missouri River.
	(1)	do.	80.44	35.00	Fair		Do.
	(1)	do.	80.44	35.00	do.		Do.
	(1)	do.	80.44	35.00	do.		Do.
		do.	3,590.00	1,700.00	do.	$62.00	Do.
	(1)	do.	No record.	45.00	do.		Do.
	(1)	do.	No record.	45.00	Good		Do.
	(1)	do.	No record.	30.00	Fair		Do.
	(1)	do.	No record.	50.00	Poor		Do.
	(1)	do.	No record.	30.00	Fair		Do.
	(1)	do.	No record.	10.00	Poor		Do.
1916	Freeburg, Mo.	do.	35.00	5.00	do.		Do.
	(1)	do.	35.00	10.00	Bad		Do.
	(1)	do.	35.00		do.		Upper Missouri River.
	(1)	do.	48.49	35.00	Fair		Lower Missouri River.
	(1)	do.	48.49	25.00	do.		Do.
	(1)	do.	48.49	35.00	do.		Do.
	(1)	do.	48.49	30.00	do.		Do.
	(1)	do.	48.49	25.00	do.		Do.
	(1)	do.	48.49	25.00	do.		Do.
	(1)	do.	38.79	25.00	do.		Do.
	(1)	do.	38.79	25.00	do.		Do.
	(1)	do.	48.49	5.00	Bad		Do.
	(1)	do.	48.49	10.00	Poor		Do.
	(1)	do.	38.79	35.00	Good		Do.
	(1)	do.	48.49	35.00	do.		Do.
	(1)	do.	38.79	15.00	Poor		Do.
	(1)	do.	38.79	25.00	Fair		Do.
	(1)	do.	38.79	30.00	Good		Do.
	(1)	do.	48.49	35.00	do.		Do.
	(1)	do.	45.09	20.00	Poor		Do.
	(1)	do.	45.09	25.00	Fair		Do.
	(1)	do.	45.09	5.00	Bad		Do.
	(1)	do.	45.09	35.00	Good		Do.
	(1)	do.	38.27	25.00	do.		Do.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	do.		Do.
1910	Stillwater. Minn.	Wood.	28.00	25.00	do.		Do.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	do.		Do.
1914	do.	do.	2,284.71	2,000.00	do.		Do.
	(1)	Wood.	15.00	5.00	Poor		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	65.00	30.00	Fair		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	65.00	30.00	do.		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	do.		Lower Missouri River.
	(1)	Wood.	65.00	30.00	Fair		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	65.00	30.00	Fair		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	65.00	25.00	Fair		Do.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Do.
	(1)	Wood.	65.00	12.00	Fair		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	65.00	5.00	Bad		Do.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Do.
	(1)	Wood.	65.00	20.00	Fair		Do.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Do.
	(1)	Wood.	No record.		Bad		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	No record.		Bad		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	No record.		Bad		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	No record.	12.00	Poor		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	No record.	10.00	Poor		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	No record.	10.00	Poor		Upper Missouri River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	No record.	15.00	Fair		Do.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Do.

TABLE 3.—*Statement of floating plant owned by the United States and*

KANSAS CITY, MO.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	in.	Ft.	in.	Ft.	in.		
119	Skiff		19	6	4	4	1	2	1916	Gasconade, Mo.
120	Pontoon		47	6	12	0	3	0	1914	Ambridge, Pa.
120	Skiff		18	0	4	3	1	3	1916	Osage, Mo.
121	do		19	6	4	4	1	2	1916	Gasconade, Mo.
122	do		19	6	4	4	1	2	1916	do
123	do		19	6	4	4	1	2	1916	do
124	do		20	0	4	9	1	6	1917	Sioux City, Iowa.
125	do		18	9	4	4	1	4	1917	Glasgow, Mo.
126	do		20	0	4	7	1	6	1917	Sioux City, Iowa.
127	do		14	9	3	7	1	2	1917	Gasconade, Mo.
128	do		20	0	4	7	1	6	1917	do
129	do		20	0	4	7	1	6	1917	do
130	do		19	0	4	6	1	5	1917	do
131	do		20	0	4	7	1	6	1917	do
132	do		20	0	4	7	1	6	1917	do
133	do		20	0	4	7	1	6	1917	do
134	do		18	0	4	5	1	3	1917	do
135	do		20	0	4	7	1	6	1917	do
136	do		20	0	4	7	1	6	1917	do
137	do		20	0	5	0	1	3	1917	do
138	do		20	0	5	0	1	3	1917	do
139	do		19	2	5	0	1	3	1917	do
140	do		22	0	4	9	1	7	1914	Dubuque, Iowa.
141	do		18	5	5	0	1	4	1914	do
142	Barge	53.00	100	0	24	0	5	0	1899	Gasconade, Mo.
142	Skiff		19	7	5	4	1	7	1914	Dubuque, Iowa.
143	do		21	7	4	8	1	5	1914	do
144	do		19	8	5	2	1	7	1914	do
145	Barge	57.00	100	0	25	0	5	4	1900	Gasconade, Mo.
145	Skiff		22	0	5	2	1	10	1914	Dubuque, Iowa.
146[2]	do		22	0	5	0	1	10	1914	do
147	Barge	57.00	100	0	25	0	5	4	1900	Gasconade, Mo.
149	do	53.00	100	0	24	0	5	0	1900	do
153	do	50.00	100	0	24	0	5	4	1910	Rock Island, Ill.
154	do	50.00	100	0	20	0	5	0	1910	do
155	do	50.00	100	0	24	0	5	0	1910	do
156	do	50.00	100	0	24	0	5	0	1910	do
161	do	47.00	100	0	24	0	5	0	1915	Gasconade, Mo.
162	do	47.00	100	0	24	0	5	0	1915	do
163	do	47.00	100	0	24	0	5	0	1915	do
164	do	47.00	100	0	24	0	5	0	1915	do
165	do	47.00	100	0	24	0	5	0	1915	do
166	do	47.00	100	0	24	0	5	0	1915	do
167	do	47.00	100	0	24	0	5	0	1915	do
168	do	47.00	100	0	24	0	5	0	1915	do
169	do	50.00	100	0	25	0	5	0	1917	do
170	do	50.00	100	0	25	0	5	0	1917	do
171	do	50.00	100	0	25	0	5	0	1917	do
172	do	50.00	100	0	25	0	5	0	1917	do
300	do	58.00	100	0	24	0	5	0	1912	Leavenworth, Kans.
301	do	58.00	100	0	24	0	5	0	1912	do
301	Lifeboat		20	0	6	3	2	1		No record
302	Barge	58.00	100	0	24	0	5	0	1912	Leavenworth, Kans.
302	Lifeboat		16	2	3	9	1	7		No record
303	Barge	58.00	100	0	24	0	5	0	1912	Leavenworth, Kans.
303	Lifeboat		20	5	6	3	2	1		No record
304	Barge	58.00	100	0	24	0	5	0	1912	Leavenworth, Kans.
304	Lifeboat		16	5	3	9	1	6½		No record
305	Barge	58.00	100	0	24	0	5	0	1912	Leavenworth, Kans.
306	do	58.00	100	0	24	0	5	0	1912	do
307	do	58.00	100	0	24	0	5	0	1912	do
308	do	58.00	100	0	24	0	5	0	1914	Green Bay, Wis.
309	do	58.00	100	0	24	0	5	0	1914	do
310	do	58.00	100	0	24	0	5	0	1914	do
311	do	58.00	100	0	24	0	5	0	1914	do
312	do	58.00	100	0	24	0	5	0	1914	do

[1] Built by United States Engineer Department.

[2] Rebuilt 1913.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

KANSAS CITY, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
	(1)	Wood.	$28.87	$10.00	Fair		Gasconade River.
1914	Ambridge, Pa.	Steel	2,284.71	2,000.00	Good		Lower Missouri River.
	(1)	Wood.	38.16	20.00	Fair		Osage River.
	(1)	do	No record.	20.00	Good		Lower Missouri River.
	(1)	do	No record.	20.00	do		Do.
	(1)	do	No record.	10.00	Fair		Do.
	(1)	do	94.02	90.00	Good		Upper Missouri River.
	(1)	do	54.53	54.53	do		Lower Missouri River.
	(1)	do	86.61	86.61	do		Upper Missouri River.
	(1)	do	25.00	25.00	do		Lower Missouri River.
	(1)	do	57.47	57.47	do		Do.
	(1)	do	57.46	57.46	do		Do.
	(1)	do	57.47	57.47	do		Do.
	(1)	do	57.47	57.47	do		Do.
	(1)	do	57.47	57.47	do		Do.
	(1)	do	57.47	57.47	do		Do.
	(1)	do	50.98	50.98	do		Do.
	(1)	do	57.47	57.47	fo		Do.
	(1)	do	50.98	50.98	do		Do.
	(1)	do	50.98	50.98	do		Do.
	(1)	do	50.98	50.98	do		Do.
	(1)	do	50.98	50.98	do		Do.
1914	Dubuque, Iowa	do	No record.	25.00	do		Do.
1914	do	do	No record.	25.00	do		Do.
(2)	(1)	Wood.	2,815.00	1,900.00	do	$18.92	Do.
1914	Dubuque, Iowa	Steel	No record.	25.00	do		Do.
1914	do	do	No record.	25.00	do		Do.
	(1)	Wood.	2,815.00	2,000.00	do	11.67	Do.
1914	Dubuque, Iowa	Steel	No record.	25.00	do		Do.
1914	do	do	No record.				Do.
	(1)	Wood.	2,815.00	2,000.00	Good	1.00	Do.
(2)	(1)	do	2,815.00	2,000.00	do	446.97	Do.
1910	Rock Island, Ill.	do	1,500.00	800.00	do	2.35	Do.
1910	do	do	1,500.00	800.00	do		Do.
1910	do	do	1,500.00	800.00	do	16.76	Do.
1910	do	do	1,500.00	800.00	do	55.43	Do.
	(1)	do	2,478.39	1,900.00	do	36.40	Do.
	(1)	do	2,478.39	1,900.00	do	30.48	Do.
	(1)	do	2,478.39	1,900.00	do	203.74	Do.
	(1)	do	2,478.39	1,900.00	do	34.18	Do.
	(1)	do	2,478.39	1,900.00	do	23.30	Do.
	(1)	do	2,478.39	1,900.00	do	11.85	Do.
	(1)	do	2,478.39	1,825.00	do	114.32	Do.
	(1)	do	2,478.39	2,000.00	do		Do.
	(1)	do	2,878.95	2,878.95	do		Do.
	(1)	do	2,915.00	2,915.00	do		Do.
	(1)	do	2,915.00	2,915.00	do		Do.
	(1)	do	2,915.00	2,915.00	do		Do.
1912	Leavenworth, Kans.	Steel	4,975.82	3,685.00	do		Do.
1912	do	do	4,975.82	3,685.00	do		Do.
	No record	Wood.	No record.	15.00	do		Do.
1912	Leavenworth, Kans.	Steel	4,975.82	3,700.00	do		Do.
	No record	Wood.	No record.	15.00	do		Do.
1912	Leavenworth, Kans.	Steel	4,975.82	3,700.00	do	1.00	Do.
	No record	Wood.	No record.	10.00	do		Do.
1912	Leavenworth, Kans.	Steel	4,975.82	3,700.00	do	57.76	Do.
	No record	Wood.	No record.	10.00	do		Do.
1912	Leavenworth, Kans.	Steel	4,975.82	3,700.00	do	1.00	Do.
1912	do	do	4,975.82	3,700.00	do	52.34	Do.
1912	do	do	4,975.82	4,000.00	do		Do.
1914	Green Bay, Wis.	do	7,317.32	3,700.00	do		Do.
1914	do	do	7,317.32	6,000.00	do		Do.
1914	do	do	7,317.32	6,300.00	do	2.80	Do.
1914	do	do	7,317.32	6,300.00	do	54.36	Do.
1914	do	do	7,317.32	6,300.00	do	26.27	Do.

[2] Boat sunk during season.

TABLE 3.—*Statement of floating plant owned by the United States and*

KANSAS CITY, MO.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
313	Barge	58.00	100	0	24	0	5	0	1914	Green Bay, Wis.
314	do	58.00	100	0	24	0	5	0	1914	do
315	do	58.00	100	0	24	0	5	0	1914	do
316	do	58.00	100	0	24	0	5	0	1914	Dubuque, Iowa
317	do	58.00	100	0	24	0	5	0	1914	do
318	do	58.00	100	0	24	0	5	0	1914	do
319	do	58.00	100	0	24	0	5	0	1914	do
320	do	58.00	100	0	24	0	5	0	1914	do
321	do	58.00	100	0	24	0	5	0	1914	do
322	do	58.00	100	0	24	0	5	0	1914	do
323	do	58.00	100	0	24	0	5	0	1914	do
324	do	58.00	100	0	24	0	5	0	1914	Gasconade, Mo.
325	do	58.00	100	0	24	0	5	0	1914	do
326	do	58.00	100	0	24	0	5	0	1914	do
327	do	58.00	100	0	24	0	5	0	1914	do
328	do	58.00	100	0	24	0	5	0	1914	do
329	do	58.00	100	0	24	0	5	0	1914	do
501	Quarterboat		100	0	20	0	5	0	[2]1910 [3]1912	Rock Island, Ill. Sioux City, Iowa
551	Pile driver	60.00	76	0	19	0	4	4	1913	do
602	Barge	50.00	100	0	25	0	5	0	1913	do
604	do	50.00	100	0	25	0	5	0	1913	do
605	do	50.00	100	0	25	0	5	0	1913	do
606	do	50.00	100	0	25	0	5	0	1913	do
607	do	50.00	100	0	25	0	5	0	1913	do
608	do	50.00	100	0	25	0	5	0	1913	do
609	do	50.00	100	0	25	0	5	0	1913	do
611	do	50.00	100	0	25	0	5	0	1913	do
612	do	50.00	100	0	25	0	5	0	1913	do
613	do	50.00	100	0	25	0	5	0	1913	do
614	do	50.00	100	0	25	0	5	0	1913	do
615	do	50.00	100	0	25	0	5	0	1913	do
616	do	50.00	100	0	25	0	5	0	1913	do
617	do	50.00	100	0	25	0	5	0	1913	do
618	do	50.00	100	0	25	0	5	0	1913	do

LITTLE ROCK, ARK.

Name or number.	Type.	Displacement in long tons.	Length.		Beam.		Depth.		When.	Where.
Dredge No. 68 [4]	Dipper dredge	220.00	109	6	30	6	5	4	1912	Batesville, Ark.
Reese, C. B	Snagboat	340.00	195	9	36	0	5	4	1879	Carondelet, Mo.
Arkansas	do	235.00	155	6	30	0	4	6	1900	Jeffersonville, Ind.
Quapaw	do	240.00	147	6	30	0	4	4	1915	Batesville, Ark.
Johnson, A. B	do	60.00	84	0	22	0	3	0	1913	Madison, Ark.
Riverside	do	57.00	84	0	22	0	3	0	1913	Poplar Bluff, Mo.
Allen, A. D	Steam towboat	150.00	137	10	25	6	4	0	1914	Batesville, Ark.
No. 1	Quarter boat	104.00	100	10	20	0	4	0	1908	do
Inspector No. 1	Gasoline launch	3.00	25	0	4	6	2	0	1908	Grafton, Ill.
Toltec	Gasoline launch (screw)	4.00	33	0	7	4	2	0	1917	St. Paul, Minn.
Talihana	do	1.50	21	0	5	0	1	6	1917	do
9-07	Decked scow (170 tons)		100	0	20	0	5	0	1907	Batesville, Ark.
9-07	do		100	0	20	0	5	0	1907	do
10-07	do		100	0	20	0	5	0	1907	do
12-13	do		100	0	20	0	5	0	1913	do
13-15	do		100	0	20	0	5	0	1915	do
2-14	Decked scow (200 tons)		100	0	26	0	5	0	1914	do
D. S. No. 1	Hopper top scow (150 tons).		100	0	20	0	5	0	1913	do
D. S. No. 2	do		100	0	20	0	5	0	1913	do
No. 1	Decked scow (60 tons)		60	0	20	0	3	0	1913	do
No. 4	Derrick boat	82.00	67	3	30	0	4	0	1916	do

---

[1] Built by United States Engineer Department.

[2] Hull

[3] Quarters.

[4] Formerly Van Frank.

[5] Creosoted yellow pine.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

KANSAS CITY, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1914	Green Bay, Wis.	...do...	$7,317.32	$4,750.00	Good..	....	Lower Missouri River.
1914	.....do...........	...do...	7,317.32	6,300.00	...do...	....	Do.
1914	.....do...........	...do...	7,317.32	4,800.00	...do...	$163.35	Do.
1914	Dubuque, Iowa.	...do...	6,651.06	4.750.00	...do...	54.37	Do.
1914	.....do...........	...do...	6,651.06	1,800.00	...do...	....	Do.
1914	.....do...........	...do...	6,651.06	5,500.00	...do...	1.00	Do.
1914	.....do...........	...do...	6,651.06	4,750.00	...do...	250.00	Do.
1914	.....do...........	...do...	6,651.06	5,500.00	...do...	....	Do.
1914	.....do...........	...do...	6,651.06	5,500.00	...do...	....	Do.
1914	.....do...........	...do...	6,651.06	4,750.00	...do...	....	Do.
1914	.....do...........	...do...	6,651.06	5,500.00	...do...	34.79	Do.
......	(1)................	...do...	5,792.68	4,900.00	...do...	14.10	Do.
......	(1)................	...do...	5,792.68	4,800.00	...do...	....	Do.
......	(1)................	...do...	5,792.68	4,900.00	...do...	7.70	Do.
......	(1)................	...do...	5,792.68	4,900.00	...do...	1.00	Do.
......	(1)................	...do...	5,792.68	4,900.00	...do...	1.00	Do.
......	(1)................	...do...	5,792.68	4,900.00	...do...	....	Do.
1910	Rock Island, Ill.	[3]Wood.	1,500.00	3,600.00	...do...	323.80	Do.
......	(1)................	...do.[3].	5,060.00	....		....	
......	(1)................	...do...	5,892.00	3,060.00	Good..	239.70	Upper Missouri River.
......	(1)................	...do...	2,445.00	1,550.00	...do...	....	Do.
......	(1)................	...do...	2,292.00	1,530.00	...do...	....	Do.
......	(1)................	...do...	3,099.00	2,400.00	...do...	....	Do.
......	(1)................	...do...	3,099.00	2,300.00	...do...	....	Do.
......	(1)................	...do...	3,099.00	2,300.00	...do...	....	Do.
......	(1)................	...do...	3,099.00	2,300.00	...do...	....	Do.
......	(1)................	...do...	3,099.00	2,400.00	...do...	2.74	Do.
......	(1)................	...do...	3,099.00	2,400.00	...do...	....	Do.
......	(1)................	...do...	3,099.00	2,300.00	...do...	....	Do.
......	(1)................	...do...	2,692.10	2,300.00	...do...	....	Do.
......	(1)................	...do...	2,712.13	2,300.00	...do...	....	Do.
......	(1)................	...do...	2,666.30	2,000.00	...do...	....	Do.
......	(1)................	...do...	2,827.64	2,000.00	...do...	....	Do.
......	(1)................	...do...	2,928.90	2,000.00	...do...	....	Do.
......	(1)................	...do...	2,890.24	2,100.00	...do...	23.95	Do.

LITTLE ROCK, ARK.

......	....	[5] Wood.	[6] $12,673.83	[7] $7,392.00	Good..	$1,403.77	Upper White River, Ark.
......	....	Iron and steel.	72,325.20	14,543.24	Fair...	899.33	Arkansas and White Rivers, Ark.
......	....	Steel..	27,138.87	5,313.24	...do...	325.90	Arkansas River, Ark.
......	....	Wood.	[6] 15,073.02	10,698.20	...do...	807.85	White, Black, and Current Rivers, Ark.
......	....	...do.[5].	[6] 4,000.00	2,342.27	Good..	580.73	St. Francis and L'Anguille Rivers, Ark.
......	....	...do...	[6] 4,000.00	2,019.00	Fair...	267.36	Black and Current Rivers, Ark., and Mo.
......	....	...do...	[6] 9,500.00	6,694.26	Good..	738.25	Upper White River, Ark.
......	....	...do...	4,217.00	300.00	Bad...	4.90	Do.
1908	Grafton, Ill......	Steel..	750.00	688.18	Good..	454.90	Do.
1917	....	Wood.	2,090.00	1,933.25	...do...	....	Arkansas River, Ark.
1917	....	...do...	915.00	846.37	...do...	....	Do.
......	....	...do...	1,917.00	....	Worthless.	....	Upper White River, Ark.
......	....	...do...	1,917.00	....	...do...	....	Do.
......	....	...do...	1,917.00	....	...do...	14.52	Do.
......	....	...do.[6].	2,689.00	1,334.50	Good..	155.36	Do.
......	....	...do...	2,602.56	1,836.75	...do...	....	Do.
......	....	...do...	2,831.30	2,125.00	...do...	....	Do.
......	....	...do...	3,293.66	1,971.00	...do...	53.60	White and Black Rivers, Ark.
......	....	...do...	3,293.66	1,971.00	...do...	53.59	Do.
......	....	...do...	851.99	515.00	...do...	....	Upper White River, Ark.
......	....	...do.[6].	5,998.74	4,981.24	...do...	281.03	Do.

[6] Rebuilding cost plus value of machinery and upper works transferred from old hull.

[7] Without outfit.

Table 3.—*Statement of floating plant owned by the United States and*

LOS ANGELES, CAL.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
San Pedro	20-inch hydraulic pipe-line dredge.	834.00	140	8	40	8	10	7	1904	San Pedro, Cal
Cerritos	Gasoline launch	7.32	36	6	9	6	4	9	1914	do
No. 1	Barge	10.00	34	6	12	0	3	6	1905	do
No. 4	Derrick barge	9.00	29	6	10	7	3	10	1904	do
No. 5	do	19.00	40	0	18	0	3	6	1912	do
No. 8	Oil barge	9.00	34	9	10	0	4	6	1904	do
No. 9	Water barge	9.00	34	9	10	0	4	6	1904	do
No. 10	Pontoon	6.00	21	3	10	0	3	0	1904	do
No. 12	do	6.00	21	3	10	0	3	0	1904	do
No. 14	do	6.00	21	3	10	0	3	0	1904	do
No. 16	do	6.00	21	3	10	0	3	0	1904	do
No. 18	do	6.00	21	3	10	0	3	0	1904	do
No. 20	do	6.00	21	3	10	0	3	0	1904	do
No. 22	do	6.00	21	3	10	0	3	0	1904	do
No. 24	do	6.00	21	3	10	0	3	0	1904	do
No. 26	do	6.00	21	3	10	0	3	0	1904	do
No. 28	do	6.00	21	3	10	0	3	0	1904	do
No. 30	do	6.00	21	3	10	0	3	0	1904	do
No. 32	do	6.00	21	3	10	0	3	0	1904	do
No. 33	do	6.00	21	3	10	0	3	0	1905	do
No. 34	do	6.00	21	3	10	0	3	0	1904	do
No. 35	do	6.00	21	3	10	0	3	0	1905	do
No. 36	do	6.00	21	3	10	0	3	0	1904	do
No. 37	do	10.00	35	0	10	0	3	0	1912	do
No. 38	do	6.00	21	3	10	0	3	0	1904	do
No. 11	do	10.00	35	0	10	0	3	0	1904	do
No. 13	do	10.00	35	0	10	0	3	0	1904	do
No. 15	do	10.00	35	0	10	0	3	0	1904	do
No. 17	do	10.00	35	0	10	3	3	0	1904	do
No. 19	do	10.00	35	0	10	3	3	0	1904	do
No. 21	do	10.00	35	0	10	3	3	0	1904	do
No. 23	do	10.00	35	0	10	3	3	0	1904	do
No. 25	do	10.00	35	0	10	3	3	0	1904	do
No. 27	do	10.00	35	0	10	3	3	0	1904	do
No. 29	do	10.00	35	0	10	3	3	0	1904	do
No. 31	do	10.00	35	0	10	3	3	0	1904	do
No. 39	do	10.00	35	0	10	3	3	0	1911	do
No. 41	do	10.00	35	0	10	3	3	0	1911	do
No. 43	do	10.00	35	0	10	3	3	0	1911	do
No. 40	do	10.00	35	0	10	3	3	0	1912	do
No. 42	do	10.00	35	0	10	3	3	0	1912	do
No. 44	do	10.00	35	0	10	3	3	0	1912	do
No. 45	do	10.00	35	0	10	3	3	0	1912	do
No. 46	do	10.00	35	0	10	3	3	0	1912	do
No. 47	do	10.00	35	0	10	3	3	0	1912	do
No. 48	do	10.00	35	0	10	3	3	0	1912	do
No. 49	do	10.00	35	0	10	3	3	0	1912	do
No. 50	do	10.00	35	0	10	3	3	0	1912	do
No. 1	Skiff		16	0	3	6	1	4	1905	do
No. 2	do		16	0	3	6	1	4	1905	do
No. 7	Rowboat		13	5	5	0	1	10		

LOUISVILLE, KY.

Name or number.	Type.	Displacement in long tons.	Length Ft.	in.	Beam Ft.	in.	Depth Ft.	in.	When.	Where.
Portland	Hydraulic pipe-line dredge.	131.00	100	0	22	0	5	0	1914	Jeffersonville, Ind
Shippingport	do	131.00	100	0	22	8	5	0	1914	do
Louisville	Dipper dredge	128.00	67	0	28	6	6	0	1886	Cincinnati, Ohio
Green River	do	268.00	112	0	31	0	4	0	[1]1896	Spottsville, Ky
Nolin River	do	210.00	88	8	30	8	6	6	1915	Pittsburgh, Pa
Casey	Combination hydraulic and bucket dredge.	163.00	86	0	28	0	6	5	1907	Louisville, Ky
Mammoth Cave	Stern-wheel snag boat	284.00	141	0	32	8	5	0	1908	Jeffersonville, Ind

[1] House and machinery installed by United States.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

LOS ANGELES, CAL.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	$98,400.00	$50,000	Good..	Dredging plant out of commission entire year. Amount expended for minor repairs and watching dredging plant, $1,807.30.	Los Angeles Harbor, Cal.
......	....	...do..	3,150.00	2,700	...do..		
......	....	...do..	373.25	170	Fair...		
......	....	...do..	377.70	150	...do..		
......	....	...do..	1,834.02	1,080	Good..		
......	....	...do..	297.40	112	Fair...		
......	....	...do..	297.40	112	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	223.70	90	...do..		
......	....	...do..	192.70	72	...do..		
......	....	...do..	223.70	90	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	302.66	202	Good..		
......	....	...do..	192.87	72	Fair...		
......	....	...do..	292.78	115	...do..		
......	....	...do..	292.78	115	...do..		
......	....	...do..	292.78	115	...do..		
......	....	...do..	292.78	115	...do..		
......	....	...do..	292.78	115	...do..		
......	....	...do..	292.78	115	...do..		
......	....	...do..	292.78	115	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	192.87	72	...do..		
......	....	...do..	295.22	189	Good..		
......	....	...do..	295.22	189	...do..		
......	....	...do..	295.22	189	...do..		
......	....	...do..	302.66	202	...do..		
......	....	...do..	302.60	202	...do..		
......	....	...do..	302.66	202	...do..		
......	....	...do..	302.66	202	...do..		
......	....	...do..	302.66	202	...do..		
......	....	...do..	302.66	202	...do..		
......	....	...do..	302.66	202	...do..		
......	....	...do..	302.66	202	...do..		
......	....	...do..	302.66	202	...do..		
......	....	...do..	38.60	27	Fair...		
......	....	...do..	38.60	27	...do..		
1897	San Diego, Cal..	...do..	80.00	25	...do..		

LOUISVILLE, KY.

[1] 1914	Jeffersonville, Ind.	Steel..	$13,331.95	$13,000.00	Good..	$565.06	Ohio River.
[1] 1914	.....do..........	...do..	13,320.78	13,000.00	...do..	420.54	Do.
1886	Cincinnati, Ohio.	Iron..	25,000.00	7,000.00	Fair...	2,976.09	Louisville and Portland Canal.
......	....	Wood.	[2] 4,093.69	750.00	Poor..	77.29	Green and Barren Rivers, Ky.
[1] 1915	Pittsburgh, Pa..	Steel..	28,814.05	30,000.00	Good..	2,003.90	Do.
......	....	Wood.	15,132.13	4,000.00	Fair...	2,444.85	Louisville and Portland Canal.
1908	Jeffersonville, Ind.	Steel..	[3] 36,845.19	32,500.00	Good..	1,563.84	Green and Barren Rivers, Ky.

[2] Rebuilt. [3] Not including cost of machinery.

TABLE 3.—*Statement of floating plant owned by the United States and*

LOUISVILLE, KY.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 1, G. and B	Derrick boat	76.00	70	0	26	0	4	0	1910	Woodbury, Ky
No. 2, G. and B	do	76.00	70	0	26	0	4	0	1910	do
No. 4, G. and B	do	120.00	80	8	26	8	5	0	1914	Jeffersonville, Ind
O. R. No. 1	do	131.00	70	0	32	0	5	0	1914	do
O. R. No. 2	do	131.00	70	0	32	0	5	0	1914	do
O. R. No. 1	Pile driver	88.00	70	0	22	0	4	5	1914	Elizabeth, Pa
O. R. No. 2	do	88.00	70	0	22	0	4	5	1914	do
O. R. No. 3	do	88.00	70	0	22	0	4	5	1914	do
No. 9	Drill boat	10.00	40	0	14	0	2	8	1910	Clarington, Ohio
No. 10	do	10.00	40	0	14	0	2	8	1910	do
No. 11	do	10.00	40	0	14	0	2	8	1910	Louisville, Ky
No. 41A, O. R.[3]	Maneuver boat	72.00	73	7	22	5	4	9	1912	do
No. 41B, O. R.[4]	do	72.00	73	7	22	5	4	9	1912	do
Cherokee	Stern-wheel steamboat	278.00	142	5	27	6	5	1	[5] 1914	Jeffersonville, Ind
Emerald	do	28.00	76	9	14	0	3	3	1899	Cincinnati, Ohio
Shawnee	do	83.00	117	0	25	4	3	6	[5] 1909	Louisville, Ky
Wave Rock	do	28.00	65	10	14	0	2	6	1898	do
Du Brie	Gasoline launch	1.90	28	6	5	0	3	8	......	Unknown
Echo River	do	6.00	40	5	9	6	4	8	[5] 1916	Louisville, Ky
Tarascon	do	1.06	26	5	6	1	2	6	1915	Salem, Ohio
Laura	do	6.00	40	9	6	7	4	2	1902	Cincinnati, Ohio
O. R. No. 1	Machine shop	91.00	90	11	24	8	6	0	1908	Ambridge, Pa
O. R. No. 1	Sawmill	138.00	124	3	30	0	4	6	1909	Louisville, Ky
O. R. No. 1	Pump boat	276.00	110	0	36	0	5	6	1914	Jeffersonville, Ind
No. 1, L. P. C	do	45.00	50	8	16	8	4	0	1914	do
No. 2, Ohio	Quarter boat	88.00	110	0	22	0	3	6	1909	Parkersburg, W. Va.
No. 3, Ohio	do	88.00	110	0	22	0	3	6	1910	Louisville, Ky
No. 4, Ohio	do	88.00	110	0	22	0	3	6	1910	do
No. 5, Ohio	do	169.00	124	6	25	0	4	2	1914	do
No. 1, G. and B	100 cubic-yard dump scow.	45.00	70	0	21	0	5	6	1910	do
No. 2, G. and B	do	45.00	70	0	21	0	5	6	1910	do
No. 17, L. P. C	do	53.00	85	0	24	0	6	0	1913	do
No. 18, L. P. C	do	53.00	85	0	24	0	6	0	1913	do
No. 19, L. P. C	150 cubic-yard dump scow.	83.00	90	8	24	8	7	0	1914	Ambridge, Pa
No. 20, L. P. C	do	83.00	90	8	24	8	7	0	1914	do
No. 21, L. P. C	do	83.00	90	8	24	8	7	0	1915	do
No. 22, L. P. C	do	83.00	90	8	24	8	7	0	1915	do
No. 1, G. and B	150-ton barge	60.00	100	0	20	0	5	0	1896	Spottsville, Ky
No. 2, G. and B	do	60.00	100	0	20	0	5	0	1896	do
No. 3, G. and B	200-ton barge	73.00	100	0	22	0	6	0	1907	Louisville, Ky
No. 4, G. and B	do	73.00	100	0	22	0	6	0	1907	do
No. 12, L. P. C	10-ton barge	9.00	40	0	12	0	2	0	1904	do
No. 14, L. P. C	35-ton barge	28.00	60	0	18	0	2	4	1908	do
No. 17, L. P. C	200-ton barge	91.00	90	11	24	8	6	0	1908	Ambridge, Pa
No. 18, L. P. C	35-ton barge	28.00	60	0	18	0	2	4	1910	Louisville, Ky
No. 19, L. P. C	do	28.00	60	0	18	0	2	4	1910	do
O. R. No. 20	100-ton barge	38.00	70	8	22	8	4	10	1913	Jeffersonville, Ind
O. R. No. 21	do	38.00	70	8	22	8	4	10	1913	do
O. R. No. 22	365-ton barge	78.00	110	8	26	8	6	6	1914	Ambridge, Pa
O. R. No. 23	do	78.00	110	8	26	8	6	6	1914	do
O. R. No. 24	do	78.00	110	8	26	8	6	6	1914	do
O. R. No. 25	do	78.00	110	8	26	8	6	6	1914	do
O. R. No. 26	do	78.00	110	8	26	8	6	6	1914	do

[1] Not including cost of machinery.

[2] House and machinery installed by United States.

[3] Formerly No. 1.

[4] Formerly No. 2.

[5] Rebuilt.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

LOUISVILLE, KY.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	[1] $2,779.30	$1,800.00	Fair...	$434.90	Green and Barren Rivers, Ky.
......	....	...do..	[1] 2,779.30	2,240.00	Good..	1,646.19	Do.
[2] 1914	Jeffersonville, Ind.	Steel..	10,291.13	9,490.00	...do..	182.63	Do.
[2] 1914	.....do..........	...do..	12,726.36	10,200.00	...do..	1,881.09	Ohio River.
[2] 1914	.....do..........	...do..	12,680.91	11,100.00	...do..	1,887.53	Do.
[2] 1914	Elizabeth, Pa...	Wood.	6,158.12	3,360.00	Fair...	553.46	Do.
[2] 1914	.....do..........	...do..	6,158.12	3,360.00	...do..	485.14	Do.
[2] 1914	.....do..........	...do..	6,158.12	1,200.00	...do..	....	Do.
[2] 1910	Clarington, Ohio	...do..	[3] 450.00	100.00	...do..	37.61	Do.
[2] 1910	.....do..........	...do..	[3] 450.00	100.00	...do..	40.83	Do.
......	....	...do..	[3] 521.00	100.00	...do..	40.82	Do.
......	....	...do..	7,455.02	3,500.00	...do..	226.42	Do.
......	....	...do..	7,455.03	4,500.00	...do..	1,019.76	Do.
1914	Jeffersonville, Ind.	Steel..	[1] 25,182.73	25,000.00	Good..	2,914.12	Louisville and Portland Canal.
1899	Cincinnati, Ohio.	Wood.	2,975.00	300.00	Poor..	1.75	Green and Barren Rivers, Ky.
......	....	...do..	[1] 8,461.21	8,400.00	Fair...	5,504.08	Do.
......	....	...do..	2,066.00	500.00	Poor..	587.36	Louisville and Portlan Canal.
1912	Madison, Ind....	...do..	800.00	100.00	...do..	....	Ohio River.
......	....	...do..	2,605.45	2,000.00	Good..	116.01	Green and Barren Rivers, Ky
1915	Salem, Ohio.....	Steel..	1,120.00	850.00	...do..	367.38	Louisville and Portland Canal.
1913	Cincinnati, Ohio.	...do..	1,000.00	600.00	Fair...	138.40	Ohio River.
1908	Ambridge, Pa...	...do..	12,163.75	10,800.00	Good..	500.00	Do.
......	....	Wood.	7,010.97	6,000.00	Fair...	36.95	Do.
[2] 1914	Jeffersonville, Ind.	Steel..	[6] 10,793.00	25,000.00	Good..	2,051.48	Do.
[2] 1914	.....do..........	...do..	[6] 2,275.00	2,800.00	...do..	284.89	Louisville and Portland Canal.
1909	Parkersburg, W. Va.	Wood.	3,825.00	100.00	Poor..	....	Ohio River.
......	....	...do..	4,649.07	3,000.00	Fair...	....	Do.
......	....	...do..	4,649.07	800.00	Poor..	251.18	Do.
......	....	...do..	[7] 3,896.99	2,500.00	Fair...	....	Do.
......	....	...do..	3,375.00	400.00	Poor..	678.22	Green and Barren Rivers, Ky.
......	....	...do..	3,375.00	400.00	...do..	532.19	Do.
......	....	...do..	4,156.17	2,800.00	Fair...	314.01	Louisville and Portland Canal.
......	....	...do..	4,156.17	2,800.00	...do..	441.13	Do.
1914	Ambridge, Pa...	Steel..	8,950.00	8,500.00	Good..	5.85	Do.
1914	.....do..........	...do..	8,950.00	8,500.00	...do..	15.46	Do.
1915	.....do..........	...do..	8,250.00	8,000.00	...do..	....	Do.
1915	.....do..........	...do..	8,250.00	8,000.00	...do..	....	Do.
......	....	Wood.	1,911.51	350.00	Poor.	562.15	Green and Barren Rivers, Ky.
......	....	...do..	1,911.51	350.00	...do..	209.00	Do.
......	....	...do..	2,614.05	600.00	...do..	33.12	Do.
......	....	...do..	2,614.05	600.00	...do..	627.01	Do.
......	....	...do..	213.95	....	Worthless.	....	Louisville and Portland Canal.
......	....	...do..	818.76	....	...do..	....	Do.
1908	Ambridge, Pa...	Steel..	7,067.19	6,500.00	Fair...	....	Do.
......	....	Wood.	823.96	300.00	...do..	....	Do.
......	....	...do..	823.96	600.00	Good..	450.77	Do.
1913	Jeffersonville, Ind.	Steel..	4,000.00	4,000.00	...do..	....	Ohio River.
1913	.....do..........	...do..	4,000.00	4,000.00	...do..	92.14	Do.
1914	Ambridge, Pa...	...do..	7,400.00	5,000.00	...do..	22.14	Do.
1914	.....do..........	...do..	7,400.00	5,000.00	...do..	368.53	Do.
1914	.....do..........	...do..	7,400.00	5,000.00	...do..	33.37	Do.
1914	.....do..........	...do..	7,400.00	5,000.00	...do..	64.10	Do.
1914	.....do..........	...do..	7,400.00	5,000.00	...do..	16.01	Do.

[6] Not including cost of house and machinery.
[7] Not including value of old hull of towboat Cherokee, upon which built.

TABLE 3.—*Statement of floating plant owned by the United States and*

LOUISVILLE, KY.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
O. R. No. 27	365-ton barrage	78.00	110	8	26	8	6	6	1914	Ambridge, Pa.
O. R. No. 28	do	78.00	110	8	26	8	6	6	1914	do
O. R. No. 29	do	78.00	110	8	26	8	6	6	1914	do
O. R. No. 30	Cement barge	80.00	100	8	26	8	6	6	1914	do
O. R. No. 31	do	80.00	100	8	26	8	6	6	1914	do
No. 17	20-ton fuel boat	10.00	40	0	14	0	2	8	1909	Louisville, Ky
No. 18	do	10.00	40	0	14	0	2	8	1909	do
No. 19	do	10.00	40	0	14	0	2	8	1910	do
O. R. No. 1	Flatboat	31.00	60	0	28	0	3	9	1914	do
O. R. No. 2	do	31.00	60	0	28	0	3	9	1914	do
No. 1	Anchor flat	6.00	24	0	16	0	3	5	1914	do
No. 2	do	6.00	24	0	16	0	3	5	1914	do
No. 1	Pontoon	1.50	20	0	5	3	3	5	1914	do
No. 2	do	1.50	20	0	5	3	3	5	1914	do
No. 3	do	1.50	20	0	5	3	3	5	1914	do
No. 4	do	1.50	20	0	5	3	3	5	1914	do
No. 5	do	1.50	20	0	5	3	3	5	1914	do
No. 6	do	1.50	20	0	5	3	3	5	1914	do
No. 7	do	1.50	20	0	5	3	3	5	1914	do
No. 8	do	1.50	20	0	5	3	3	5	1914	do
No. 9	do	1.50	20	0	5	3	3	5	1914	do
No. 11	do	1.50	20	0	5	3	3	5	1914	do
No. 12	do	1.50	20	0	5	3	3	5	1914	do
No. 13	do	1.50	20	0	5	3	3	5	1914	do
No. 14	do	1.50	20	0	5	3	3	5	1914	do
No. 15	do	1.50	20	0	5	3	3	5	1914	do
No. 16	do	1.50	20	0	5	3	3	5	1914	do
No. 17	do	1.50	20	0	5	3	3	5	1914	do
No. 18	do	1.50	20	0	5	3	3	5	1914	do
No. 19	do	1.50	20	0	5	3	3	5	1914	do
No. 20	do	1.50	20	0	5	3	3	5	1914	do
No. 21	do	1.50	20	0	5	3	3	5	1914	do
No. 22	do	1.50	20	0	5	3	3	5	1914	do
No. 23	do	1.50	20	0	5	3	3	5	1914	do
No. 24	do	1.50	20	0	5	3	3	5	1914	do
No. 25	do	1.50	20	0	5	3	3	5	1914	do
No. 26	do	1.50	20	0	5	3	3	5	1914	do
No. 27	do	1.50	20	0	5	3	3	5	1914	do
No. 28	do	1.50	20	0	5	3	3	5	1914	do
No. 3, G. and B.[3]	Mixer flat	76.00	70	0	26	0	4	0	1906	Greencastle, Ky.

MANILA, P. I.

Name or number.	Type.	Displacement in long tons.	Length ft.	Length in.	Beam ft.	Beam in.	Depth ft.	Depth in.	When.	Where.
Engineer	Screw steam tug	298.8	106	0	20	0	11	0	1907	Hongkong, China
No. 1-D	Barge, deck	166	75	6	28	6	7	0	1905	Iloilo, P. I.
No. 4	do	215	75	0	26	2	7	8½	1907	Manila, P. I.
No. 5[4]	Barge, derrick	166	75	6	28	6	7	0	1905	Iloilo, P. I
No. 6[7]	Sand dredge	103	58	0	20	0	6	0	1908	Corregidor Island
No. 8	Barge, deck	394	110	0	30	0	8	0	1910	Manila, P. I.
No. 9	do	394	110	0	30	0	8	0	1910	do
No. 11	Barge, hold	394	110	0	30	0	8	0	1911	do
No. 12	Barge, deck	215	75	0	26	2	7	8½	1912	do
No. 13	do	215	75	0	26	2	7	8½	1912	do

[1] House installed by United States.
[2] Not including cost of house.
[3] Formerly No. 3, G. and B. derrick boat.
[4] Formerly No. 5, barge, deck.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

LOUISVILLE, KY.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1914	Ambridge, Pa.	Steel	$7,400.00	$5,000.00	Good		Ohio River.
1914	do	do	7,400.00	5,000.00	do	$159.50	Do.
1914	do	do	7,400.00	5,000.00	do	22.49	Do.
[1] 1914	do	do	[2] 6,600.00	6,000.00	do	8.00	Do.
[1] 1914	do	do	[2] 6,600.00	6,000.00	do	8.06	Do.
		Wood	396.11	75.00	Poor		Do.
		do	396.11	75.00	do		Do.
		do	521.00	50.00	do		Do.
		do	1,425.73	1,000.00	Fair	11.45	Do.
		do	1,425.73	1,000.00	do	9.89	Do.
		do	360.02	200.00	do	66.62	Do.
		do	360.02	200.00	do	.47	Do.
		do	90.83	25.00	Poor		Do.
		do	90.83	45.00	Fair		Do.
		do	90.83	45.00	do		Do.
		do	90.83	25.00	Poor		Do.
		do	90.83	45.00	Fair		Do.
		do	90.83	25.00	Poor		Do.
		do	90.83	25.00	do		Do.
		do	90.83	45.00	Fair		Do.
		do	90.83	25.00	Poor		Do.
		do	90.83	45.00	Fair		Do.
		do	90.83	25.00	Poor		Do.
		do	90.83	45.00	Fair		Do.
		do	90.83	45.00	do		Do.
		do	90.83	45.00	do		Do.
		do	90.83	45.00	do		Do.
		do	90.83	45.00	do		Do.
		do	90.83	25.00	Poor		Do.
		do	90.83	25.00	do		Do.
		do	90.83	25.00	do		Do.
		do	90.83	45.00	Fair		Do.
		do	90.83	45.00	do		Do.
		do	90.83	25.00	Poor		Do.
		do	90.83	25.00	do		Do.
		do	90.83	45.00	Fair		Do.
		do	90.83	45.00	do		Do.
		do	90.83	25.00	Poor		Do.
		do	90.83	45.00	Fair		Do.
		do	2,520.52	600.00	Poor	$19.50	Green and Barren Rivers, Ky.

MANILA, P. I.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
1908	Hongkong, China.	Steel	$44,811.47	$27,000	Good	$3,528.26	Defensive works, Philippine Islands.
1909	Iloilo, P. I.	Wood	3,000.00	350	Fair		Do.
1907	Manila, P. I.	do	4,372.00	400	do		Do.
1909	Iloilo, P. I.	do	[5] 3,000.00	[6] 2,000	do		Do.
		do	[6] 2,500.00	[7] 700	Poor [8]		Do.
1910	Manila, P. I.	do	8,069.00	2,500	Good		Do.
1910	do	do	8,370.00	2,200	do	3,262.60	Do.
1911	do	do	6,036.88	2,800	do		Do.
1912	do	do	3,773.96	2,000	do	1,550.50	Do.
1912	do	do	3,773.96	2,000	do		Do.

[5] Original cost of hull only.

[6] Including machinery.

[7] Formerly No. 6, barge, deck.

[8] Hull in poor condition. Machinery in good condition.

TABLE 3.—*Statement of floating plant owned by the United States and*

MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Chisca	Stern-wheel towboat	450	185	6	34	11	4	8	1897	Jeffersonville, Ind
Graham	do	138	136	1	27	8	4	0	1879	Pittsburgh, Pa
Itasca	do	80	94	0	15	5	5	0	1882	Carondelet, Mo
Minnetonka	do	490	204	2	36	2	5	4	1883	Jeffersonville, Ind
Nolty, Augustus J	do	150	136	0	25	1	5	0	1912	Dubuque, Iowa
Rees, W. M	do	150	136	0	25	1	5	0	1912	do
Search [1]	do	200	138	10	28	9	4	10	1893	Marietta, Ohio
Wynoka	do	560	199	4	37	8	5	6	1899	Dubuque, Iowa
Opelika [2]	Gasoline launch	37	60	6	12	6	5	3	1912	Alton, Ill
No. 3	Derrick boat	60	75	0	30	0	5	0	1905	Memphis, Tenn
No. 1017	do	74	90	0	32	0	5	0	1911	do
No. 1411	do	84	90	0	32	0	5	0	1914	do
No. 2	Hydraulic grader	150	110	0	30	0	5	0	1882	New Albany, Ind
No. 1022	do	180	110	0	30	0	6	0	1911	Memphis, Tenn
No. 1205	do	192	120	11	30	2	7	0	1914	do
No. 1401 [4]	do	196	120	11	30	2	7	0	1915	do
No. 1407 [5]	Hydraulic sand and gravel digger.	165	120	0	30	0	7	0	1915	do
No. 4	Pile driver	75	68	0	20	0	3	1	1894	Cincinnati, Ohio
No. 1208 [6]	Concrete-mixing plant	400	120	11	45	2	7	0	1915	Memphis, Tenn
Dry Dock	Floating	140	145	0	36	0	10	0	1889	do
No. 2	Quarter boat	130	135	0	30	0	3	11	1893	Cincinnati, Ohio
No. 3	do	130	135	0	30	0	3	11	1893	do
No. 5	do	130	135	0	30	0	3	11	1893	do
No. 6	do	130	135	0	30	0	3	11	1893	do
No. 8	Store boat	125	135	0	31	0	8	0	1882	Memphis, Tenn
No. 11	Quarter boat	125	135	0	31	0	8	0	1882	do
No. 12	Store boat	125	135	0	31	0	8	0	1882	do
No. 25	Quarter boat	125	135	0	31	0	8	0	1882	Up Ohio River
No. 26	Carpenter shop boat	125	135	0	31	0	8	0	1882	do
No. 27	Quarter boat	82	100	4	26	5	4	0	1882 [7]	Up Ohio River
No. 29 (Amelia)	do	43	90	6	18	6	4	0	1882	do
No. 206	do	130	120	0	30	0	6	0	1894	Memphis, Tenn
No. 221	do	130	120	0	30	0	6	0	1894	do
No. 0601	do	30	68	0	23	6	4	0	1906	do
No. 1020	do	156	140	0	30	0	4	0	1911	do
No. 1021	do	156	140	0	30	0	4	0	1911	do
No. 1301	do	77	100	0	26	0	4	0	1914	do
No. 1402	do	190	160	0	36	0	4	0	1914	do
No. 1	Machine-shop boat	165	132	0	32	0	8	0	1882	New Albany, Ind
No. 0806	Boiler-shop boat	100	120	0	30	0	7	0	1908	Memphis, Tenn
No. 5	Mattress barge	195	145	0	30	0	6	0	1893	Elizabeth, Ohio
No. 6	do	195	145	0	30	0	6	0	1893	do
No. 9308	do	190	141	2	30	2	4	0	1893	Levonna, Ohio
No. 9312	do	190	141	2	30	2	4	0	1893	do
No. 0701	do	185	140	0	32	0	4	0	1907	Memphis, Tenn
No. 0703	do	185	140	0	32	0	4	0	1907	do
No. 1018	do	185	140	0	30	0	4	0	1910	do
No. 1019	do	185	140	0	30	0	4	0	1910	do
No. 1501	do	278	126	0	40	0	2	6	1915	do
No. 1502	do	278	126	0	40	0	2	0	1915	do
No. 1	Mooring barge	70	120	0	25	0	5	0	1890	do
No. 2	do	70	120	0	25	0	5	0	1890	do
No. 1222	do	80	125	0	26	0	5	0	1912	do
No. 1223	do	80	125	0	26	0	5	0	1912	do
No. 1224	do	80	125	0	26	0	5	0	1912	do
No. 1225	do	80	125	0	26	0	5	0	1912	do
No. 9309 [3]	400-ton decked barge	83	120	0	30	0	6	0	1893	Elizabeth, Ohio
No. 9318	do	83	120	0	30	0	6	0	1893	Madison, Ind
No. 9319	do	83	120	0	30	0	6	0	1893	do
No. 9327	do	83	120	0	30	0	6	0	1893	Levonna, Ohio
No. 122	Model barge	425	135	0	28	0	5	0	1894	Cincinnati, Ohio
No. 126	do	425	135	0	28	0	5	0	1894	do

[1] Formerly No. 96235 and H. D. Munson.

[2] Formerly Santa Claus.

[3] Creosoted.

[4] Formerly decked barge No. 1211.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

MEMPHIS, TENN., (M. R. C.), FIRST AND SECOND DISTRICTS.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	$25,900.00	$25,886.87	Poor..	$991.00	Improving Mississippi River, first and second districts.
1884	Pittsburgh, Pa..	...do..	9,500.00	17,366.15	Good..	316.99	Do.
		Iron...	9,500.00	8,424.62	Poor..	1,842.03	Do.
1884	St. Louis, Mo...	Wood.	40,000.00	21,381.30	...do..	149.86	Do.
		Steel..	34,735.00	30,801.96	Good..	786.97	Do.
......	....	...do..	34,735.00	32,407.91	...do...	991.42	Do.
1895	St. Louis, Mo...	Wood.	9,000.00	9,573.03	...do..	1,173.77	Do.
		Steel..	45,672.00	20,714.59	...do..	3,686.22	Do.
1913	St. Louis, Mo...	Wood.	13,500.00	9,825.93	...do..	1,403.92	Do.
......	....	...do.[8].	2,956.00	5,526.95	...do...	226.15	Do.
......	....	...do.[8].	5,959.40	3,974.13	...do...	20.63	Do.
......	....	...do.[8].	8,481.70	7,794.93	...do...	83.56	Do.
......	....	...do..	30,232.00	....	Worthless.	....	Do.
......	....	...do.[8].	15,900.00	12,177.49	Good..	774.70	Do.
......	....	Steel..	31,721.07	27,695.06	...do..	1,550.63	Do.
......	....	...do..	30,803.43	26,902.64	...do...	15.53	Do.
......	....	Wood[8]	13,445.00	11,004.19	...do..	29.95	Do.
1916	St. Louis, Mo...	...do..	4,500.00	1,542.05	Fair...	12.05	Do.
		Steel..	32,890.00	37,528.73	Good..	3,231.26	Do.
......	....	Wood.	9,475.00	574.24	Poor..	125.52	Do.
1916	St. Louis, Mo...	...do..	5,200.00	2,988.00	Fair...	....	Do.
1916	.....do..........	...do..	5,200.00	2,988.00	...do...	....	Do.
1916	.....do..........	...do..	5,200.00	3,278.90	...do...	290.90	Do.
1916	.....do..........	...do..	5,200.00	3,030.35	Poor..	32.35	Do.
......	....	...do..	3,645.00	2,526.48	Fair...	116.50	Do.
......	....	...do..	3,645.00	....	Worthless.	....	Do.
......	....	...do..	3,645.00	3,005.07	Fair...	643.84	Do.
......	....	...do..	3,645.00	....	Worthless.	19.69	Do.
......	....	...do..	3,645.00	1,500.45	Poor..	1,165.35	Do.
......	....	...do..	2,788.00	3,615.07	Good..	....	Do.
......	....	...do..	2,741.00	1,003.55	...do...	....	Do.
......	....	...do..	4,900.00	3,492.90	Fair...	44.26	Do.
......	....	...do..	4,900.00	3,901.33	...do...	....	Do.
......	....	...do..	3,059.00	1,879.23	Good..	....	Do.
......	....	...do.[8].	9,889.11	5,866.84	...do...	177.55	Do.
......	....	...do.[8].	9,889.11	5,539.75	...do...	....	Do.
......	....	...do.[8].	5,800.00	4,085.19	...do...	....	Do.
......	....	...do.[8].	10,399.94	7,325.43	...do...	....	Do.
......	....	...do..	8,501.00	8,496.82	Fair...	790.03	Do.
......	....	...do..	3,531.51	728.95	Poor..	79.90	Do.
......	....	...do.[8].	4,530.00	2,462.82	Fair...	269.52	Do.
......	....	...do.[8].	4,530.00	2,462.82	...do...	243.31	Do.
......	....	...do.[8].	2,800.00	5,031.33	...do...	....	Do.
......	....	...do.[8].	2,800.00	5,146.90	...do...	....	Do.
......	....	...do.[8].	5,120.00	3,065.59	Good..	....	Do.
......	....	...do.[8].	5,120.00	3,221.69	...do...	....	Do.
......	....	...do.[8].	4,642.91	3,180.25	...do...	....	Do.
......	....	...do.[8].	4,642.91	3,159.67	...do...	....	Do.
......	....	...do.[8].	6,968.09	6,659.19	...do...	40.70	Do.
......	....	...do.[8].	6,968.09	6,843.03	...do...	42.60	Do.
......	....	...do..	2,023.00	283.40	Poor..	....	Do.
......	....	...do..	2,023.00	95.45	...do...	....	Do.
......	....	...do.[8].	3,560.00	2,345.31	Good..	....	Do.
......	....	...do.[8].	3,780.00	2,473.71	...do...	....	Do.
......	....	...do.[8].	3,560.00	2,372.09	...do...	....	Do.
......	....	...do.[8].	3,780.00	2,500.26	...do...	....	Do.
......	....	...do.[8].	3,170.00	3,092.82	Poor..	4.79	Do.
......	....	...do.[8].	3,170.00	1,494.19	Fair...	....	Do.
......	....	...do..	3,170.00	....	Worthless.	....	Do.
......	....	Wood[8]	2,466.66	2,016.88	Fair...	....	Do.
1916	St. Louis, Mo...	Wood.	3,847.00	1,269.18	Poor..	....	Do.
1916	.....do..........	...do..	2,885.00	1,326.90	...do...	....	Do.

[5] Formerly decked barge No. 1407.

[6] Formerly steel barge 1208.

[7] Hull rebuilt in 1916 by United States.

[8] Coal loading outfit on barge.

TABLE 3.—*Statement of floating plant owned by the United States and*

MEMPHIS, TENN., (M. R. C.), FIRST AND SECOND DISTRICTS—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 128	Model barge	425	135	0	28	0	5	0	1894	Madison, Ind
No. 131	do	425	135	0	28	0	5	0	1894	do
No. 133	do	425	135	0	28	0	5	0	1894	do
No. 134	do	425	135	0	28	0	5	0	1894	Jeffersonville, Ind
No. 135	do	425	135	0	28	0	5	0	1894	do
No. 137	do	425	135	0	28	0	5	0	1894	do
No. 212	do	425	135	0	28	0	5	0	1894	Madison, Ind
No. 216	do	425	135	0	28	0	5	0	1894	Cincinnati, Ohio
No. 217	do	425	135	0	28	0	5	0	1894	do
No. 0801	500-ton decked barge	100	120	0	30	0	7	0	1908	Gulfport, Miss
No. 0802	do	100	120	0	30	0	7	0	1908	do
No. 0803	do	100	120	0	30	0	7	0	1908	do
No. 0804	do	100	120	0	30	0	7	0	1908	do
No. 0805	do	100	120	0	30	0	7	0	1908	Memphis, Tenn
No. 0807	do	100	120	0	30	0	7	0	1908	do
No. 0808	do	100	120	0	30	0	7	0	1908	do
No. 0809	do	100	120	0	30	0	7	0	1908	do
No. 0811	do	100	120	0	30	0	7	0	1908	Gulfport, Miss
No. 0901	do	100	120	0	30	0	7	0	1909	do
No. 0903	do	100	120	0	30	0	7	0	1909	do
No. 1001	do	100	120	0	30	0	7	0	1910	Memphis, Tenn
No. 1002	do	100	120	0	30	0	7	0	1910	do
No. 1003	do	100	120	0	30	0	7	0	1910	do
No. 1004 [1]	do	100	120	0	30	0	7	0	1910	do
No. 1005	do	100	120	0	30	0	7	0	1911	do
No. 1006	do	100	120	0	30	0	7	0	1911	do
No. 1007	do	100	124	0	30	0	7	0	1910	New Orleans, La
No. 1008	do	100	124	0	30	0	7	0	1910	do
No. 1009	do	100	124	0	30	0	7	0	1910	do
No. 1010	do	100	124	0	30	0	7	0	1910	do
No. 1011	do	100	124	0	30	0	7	0	1910	do
No. 1012	do	100	124	0	30	0	7	0	1910	do
No. 1101	do	100	120	0	30	0	7	0	1911	Memphis, Tenn
No. 1201 [1]	do	120	120	11	30	2	7	0	1912	Ambridge, Pa
No. 1202	do	120	120	11	30	2	7	0	1912	do
No. 1203	do	120	120	11	30	2	7	0	1912	do
No. 1204	do	120	120	11	30	2	7	0	1912	do
No. 1206	do	120	120	11	30	2	7	0	1912	do
No. 1207	do	120	120	11	30	2	7	0	1912	do
No. 1209	do	120	120	11	30	2	7	0	1912	do
No. 1210	do	120	120	11	30	2	7	0	1912	do
No. 1212	do	120	120	11	30	2	7	0	1912	do
No. 1213	do	120	120	11	30	2	7	0	1912	do
No. 1214	do	120	120	11	30	2	7	0	1912	do
No. 1215	do	100	120	0	30	0	7	0	1912	Memphis, Tenn
No. 1216	do	100	120	0	30	0	7	0	1912	do
No. 1217	do	100	120	0	30	0	7	0	1912	do
No. 1218	do	100	120	0	30	0	7	0	1912	do
No. 1219	do	100	120	0	30	0	7	0	1912	do
No. 1220	do	100	120	0	30	0	7	0	1912	do
No. 1221	do	100	120	0	30	0	7	0	1912	do
No. 1302	do	100	120	0	30	0	7	0	1913	do
No. 1303	do	100	120	0	30	0	7	0	1913	do
No. 1304	do	100	120	0	30	0	7	0	1913	do
No. 1305	do	100	120	0	30	0	7	0	1913	do
No. 1306	do	100	120	0	30	0	7	0	1913	do
No. 1307	do	120	121	4	30	2	7	0	1913	Ambridge, Pa
No. 1308	do	120	121	4	30	2	7	0	1913	do
No. 1309	do	120	121	4	30	2	7	0	1913	do
No. 1310	do	120	121	4	30	2	7	0	1913	do
No. 1314	do	120	121	4	30	2	7	0	1913	do
No. 1315	do	120	121	4	30	2	7	0	1913	do
No. 1316	do	120	121	4	30	2	7	0	1913	do
No. 1317	do	120	121	4	30	2	7	0	1913	do
No. 1318	do	120	121	4	30	2	7	0	1913	do
No. 1403	do	100	120	0	30	0	7	0	1914	Memphis, Tenn
No. 1404	do	100	120	0	30	0	7	0	1914	do
No. 1405	do	100	120	0	30	0	7	0	1914	do
No. 1406	do	100	120	0	30	0	7	0	1914	do

---

[1] Creosoted.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1916	St. Louis, Mo.	Wood.	$3,590.00	$1,510.95	Poor.	$204.45	Improving Mississippi River, first and second districts.
1916	do.	do.	3,590.00	1,284.60	do.		Do.
1916	do.	do.	3,650.00	1,897.54	do.	121.46	Do.
1916	do.	do.	3,650.00	1,281.00	do.		Do.
1916	do.	do.	3,650.00	1,281.00	do.		Do.
1916	do.	do.	3,650.00	1,527.00	do.	192.00	Do.
1916	do.	do.	3,800.00	1,272.00	do.		Do.
1916	do.	do.	3,597.00	1,284.18	do.		Do.
1916	do.	do.	3,597.00	1,284.18	do.		Do.
		do.[1]	5,727.53	2,754.68	Good.		Do.
		do.[1]	5,727.53	2,663.58	do.		Do.
		do.[1]	5,727.53	2,846.28	do.		Do.
		do.[1]	5,727.53	2,694.08	do.		Do.
		do.[1]	3,531.50	659.24	Poor.	79.20	Do.
		do.[1]	5,624.70	1,588.68	Fair.		Do.
		do.[1]	5,624.70	1,476.46	do.		Do.
		do.[1]	5,624.70	1,475.10	do.		Do.
		do.[1]	5,727.53	2,663.30	Good.		Do.
		do.[1]	5,569.58	2,741.53	do.		Do.
		do.[1]	5,569.58	2,760.47	do.	2.10	Do.
		do.[1]	4,242.00	3,190.01	do.		Do.
		do.[1]	4,242.00	2,653.45	do.		Do.
		do.[1]	4,242.00	2,661.85	do.		Do.
		do.[1]	4,242.00	3,278.60	do.	599.95	Do.
		do.[1]	4,050.00	2,668.89	do.		Do.
		do.[1]	4,050.00	2,594.47	do.		Do.
		do.[1]	4,246.58	2,877.56	do.		Do.
		do.[1]	4,246.58	2,806.46	Fair.		Do.
		do.[1]	4,246.58	2,921.10	do.		Do.
		do.[1]	4,246.58	2,794.22	do.		Do.
		do.[1]	4,246.58	2,852.11	Good.		Do.
		do.[1]	4,246.58	2,788.02	do.		Do.
		do.[1]	4,300.00	3,068.95	do.		Do.
		Steel.	8,900.00	7,242.03	do.	396.06	Do.
		do.	8,900.00	6,760.51	do.	59.63	Do.
		do.	8,900.00	6,793.84	do.		Do.
		do.	8,900.00	6,753.49	do.		Do.
		do.	8,900.00	6,787.13	do.		Do.
		do.	8,900.00	6,756.23	do.		Do.
		do.	8,900.00	6,799.73	do.	68.49	Do.
		do.	8,900.00	6,853.62	do.		Do.
		do.	8,900.00	6,543.12	do.		Do.
		do.	8,900.00	6,543.12	do.		Do.
		do.	8,900.00	6,823.12	do.		Do.
		Wood[1]	4,194.00	3,041.87	do.		Do.
		do.[1]	4,194.00	3,165.88	do.		Do.
		do.[1]	4,194.00	2,934.77	do.		Do.
		do.[1]	4,194.00	3,008.90	do.		Do.
		do.[1]	4,194.00	3,877.35	do.	28.00	Do.
		do.[1]	4,194.00	2,953.65	do.		Do.
		do.[1]	4,194.00	3,000.23	do.		Do.
		do.[1]	4,773.15	3,627.85	do.	80.72	Do.
		do.[1]	4,773.15	3,420.77	do.		Do.
		do.[1]	4,773.15	3,502.68	do.		Do.
		do.[1]	4,773.15	3,758.61	do.		Do.
		do.[1]	4,773.15	3,475.58	do.	13.60	Do.
		Steel.	8,500.00	6,700.30	do.	3.80	Do.
		do.	8,500.00	6,705.86	do.		Do.
		do.	8,500.00	6,696.50	do.		Do.
		do.	8,500.00	6,776.84	do.	80.34	Do.
		do.	8,500.00	6,696.50	do.		Do.
		do.	8,500.00	6,696.50	do.		Do.
		do.	8,500.00	6,771.36	do.	74.86	Do.
		do.	8,500.00	6,998.29	do.	301.79	Do.
		do.	8,500.00	6,696.50	do.		Do.
		Wood[1]	4,500.00	3,627.58	do.		Do.
		do.[1]	4,500.00	3,688.88	do.		Do.
		do.[1]	4,500.00	3,898.24	do.		Do.
		do.[1]	4,500.00	3,558.57	do.		Do.

[1] Deck house built for cement.

TABLE 3.—*Statement of floating plant owned by the United States and*

MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 1408	500-ton decked barge	100	120 0	30 0	7 0	1914	Jacksonville, Ind
No. 1409	do	100	120 0	30 0	7 0	1914	do
No. 1410	do	100	120 0	30 0	7 0	1914	do
No. 1701	do	100	120 6	30 0	7 0	1917	do
No. 1702	do	100	120 6	30 0	7 0	1917	do
No. 1703	do	100	120 6	30 0	7 0	1917	do
No. 1704	do	100	120 6	30 0	7 0	1917	do
No. 1705	do	100	120 6	30 0	7 0	1917	do
No. 1706	do	100	120 6	30 0	7 0	1917	do
No. 1707	do	100	120 6	30 0	7 0	1917	do
No. 4	Flat	10	50 0	15 0	3 0	1906	do
No. 5	do	10	50 0	15 0	3 0	1911	do
No. 1311	do	10	60 0	20 0	3 0	1913	do
No. 1312	do	10	60 0	20 0	3 0	1913	do
No. 1313	do	10	60 0	30 0	3 0	1913	do
No. 1708	do	10	58 6	20 0	3 0	1917	do
No. 1709	do	10	58 6	20 0	3 0	1917	do
No. 1	Calking flat	.5	32 0	5 0	1 0	1906	do
No. 1	Skiff		10 0	3 6	1 6	1915	Grafton, Ill
No. 2	do		22 0	5 0	1 8	1915	Memphis, Tenn
No. 3	do		21 0	4 9	1 5	1916	do
No. 4	do		20 0	4 9	1 6	1916	do
No. 5	do		20 0	4 9	1 6	1916	do
No. 6	do		20 0	4 9	1 6	1917	do
No. 7	do		20 0	4 9	1 0	1917	do
No. 13	do		18 0	4 6	1 6	1910	Leavenworth, Ind
No. 14	do		18 0	4 6	1 6	1910	do
No. 15	do		18 0	4 6	1 6	1910	do
No. 16	do		16 0	3 0	1 6	1912	Memphis, Tenn
No. 18	do		20 0	5 0	2 0	1909	do
No. 19	do		20 0	5 0	2 0	1909	do
No. 20	do		20 0	5 0	2 0	1909	do
No. 21	do		20 0	5 0	2 0	1909	do
No. 22	do		20 0	5 0	1 6	1913	do
No. 23	do		20 0	5 0	1 6	1913	do
No. 24	do		20 0	5 0	1 6	1913	do
No. 25	do		20 0	5 0	1 6	1913	do
No. 26	do		18 0	4 6	1 5	1914	do
No. 27	do		20 0	5 2	1 6	1914	do
No. 28	do		24 0	5 0	1 6	1914	do
No. 29	do		21 10	4 9	1 4	1914	do
No. 30	do		21 10	4 9	1 4	1914	do
No. 31	do		21 10	4 9	1 4	1914	do
No. 32	do		14 0	4 6	2 0		
No. 33	Metallic yawl		25 0	5 5	1 6		
No. 34	do		25 0	5 5	1 6		
No. 35	do		25 0	5 5	1 6		
Search No. 1	Life boat		16 0	4 6	1 6	1895	St. Louis, Mo
Search No. 2	do		16 0	4 6	1 6	1895	do

MILWAUKEE, WIS.

Name or number.	Type.	Displacement in long tons.	Length.	Beam.	Depth.	When.	Where.
Appleton	Steam dipper dredge	214.00	90 0	32 0	7 0	1872	Dubuque, Iowa
Kewaunee	do	442.50	100 0	34 0	9 0	1913	Milwaukee, Wis
Omro [1]	Steam grapple dredge	150.00	100 0	30 0	6 0	1878	Portage, Wis
Oshkosh [1]	Steam elevator dredge	234.00	75 0	31 0	6 0	1905	Green Bay, Wis
Ariadne	Steam launch (screw)	8.00	45 6	9 0	4 0	1899	Manitowoc, Wis
Industry	Steam tug (screw)	110.00	71 8	16 0	7 10	1890	do
Manitowoc	Tow and survey steamer (screw).	200.00	100 0	21 6	10 7	1909	do

[1] Creosoted.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood[1]	$4,500.00	$3,599.51	Good..	....	Improving Mississippi River, first and second districts.
......	....	...do..	4,500.00	3,549.87	...do..	....	Do.
......	....	...do..	4,500.00	3,699.35	...do..	....	Do.
......	....	...do.[1].	4,830.00	4,709.25	...do..	....	Do.
......	....	...do.[1].	4,830.00	4,709.25	...do..	....	Do.
......	....	...do.[1].	4,830.00	4,709.25	...do..	....	Do.
......	....	...do.[1].	4,830.00	4,709.25	...do..	....	Do.
......	....	...do.[1].	4,830.00	4,709.25	...do..	....	Do.
......	....	...do.[1].	4,830.00	4,709.25	...do..	....	Do.
......	....	...do.[1].	4,830.00	4,709.25	...do..	....	Do.
......	....	...do.[1].	460.50	79.72	Poor..	$2.75	Do.
......	....	...do.[1].	499.80	362.36	Fair...	5.87	Do.
......	....	...do.[1].	743.04	544.89	Good..	....	Do.
......	....	...do.[1].	743.04	550.70	...do..	....	Do.
......	....	...do.[1].	743.04	556.13	...do..	....	Do.
......	....	...do.[1].	992.00	967.20	...do..	....	Do.
......	....	...do.[1].	992.00	967.20	...do..	....	Do.
......	....	...do..	20.00	30.80	...do..	12.00	Do.
1916	Grafton, Ill......	Steel..	47.23	45.62	...do..	5.00	Do.
1916	Memphis, Tenn.	Wood.	40.00	34.60	...do..	5.00	Do.
1916	.....do...........	...do..	40.00	39.60	...do..	5.00	Do.
1916	.....do...........	...do..	40.00	38.60	...do..	5.00	Do.
1915	.....do...........	...do..	40.00	38.60	...do..	5.00	Do.
1917	.....do...........	...do..	40.00	38.80	...do..	....	Do.
1917	.....do...........	...do..	40.00	38.80	...do..	....	Do.
1910	Leavenworth, Ind.	...do..	35.00	12.85	Fair...	5.00	Do.
1910	.....do...........	...do..	35.00	12.85	...do..	5.00	Do.
1910	.....do...........	...do..	35.00	12.85	...do..	5.00	Do.
1912	Memphis, Tenn.	...do..	39.00	27.66	...do..	5.00	Do.
1909	.....do...........	...do..	40.00	12.60	...do..	5.00	Do.
1909	.....do...........	...do..	40.00	12.60	...do..	5.00	Do.
1909	.....do...........	...do..	40.00	12.60	...do..	5.00	Do.
1909	.....do...........	...do..	40.00	12.60	...do..	5.00	Do.
......	....	...do..	39.00	19.66	...do..	5.00	Do.
......	....	...do..	39.00	19.66	...do..	5.00	Do.
......	....	...do..	39.00	19.66	...do..	5.00	Do.
......	....	...do..	39.00	14.66	...do..	....	Do.
1914	Memphis, Tenn.	...do..	36.00	17.84	Good..	....	Do.
1914	.....do...........	...do..	40.00	17.60	...do..	....	Do.
1914	.....do...........	...do..	48.00	30.08	...do..	....	Do.
......	....	...do..	42.00	33.48	...do..	....	Do.
......	....	...do..	42.00	33.48	...do..	....	Do.
......	....	...do..	42.00	33.48	...do..	....	Do.
1916	....	Steel..	50.00	8.00	Poor..	....	Do.
......	....	...do..	50.00	13.00	Fair...	....	Do.
......	....	...do..	50.00	13.00	...do..	....	Do.
......	....	...do..	50.00	13.00	...do..	....	Do.
1895	St. Louis, Mo...	...do..	85.00	16.60	...do..	5.00	Do.
1895	.....do...........	...do..	85.00	16.60	...do..	5.00	Do.

MILWAUKEE, WIS.

1876	Berlin, Wis.....	Wood.	$13,000.00	$10,200.00	Good .	$1,782.15	Fox River improvement.
......	....	Composite.	47,750.00	42,500.00	...do...	5,687.42	Harbors, west shore of Lake Michigan.
......	....	Wood.	5,500.00	[3] 5,500.00	Fair...	828.38	Fox River improvement.
......	....	...do...	27,500.00	18,000.00	Good..	3,580.42	Do.
......	....	...do...	2,400.00	900.00	Poor..	190.32	Harbors, west shore of Lake Michigan.
1899	Menominee, Mich.	...do...	5,000.00	3,500.00	Good..	683.30	Do.
......	....	Steel..	39,000.00	[3] 42,000.00	...do...	1,698.26	Do.

[3] Includes betterments.

TABLE 3.—*Statement of floating plant owned by the United States and*

MILWAUKEE, WIS.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Fox	Steam tug (side-wheel)	128.00	107	9	30	0	5	0	1900	Oshkosh, Wis.
Wolf	.....do	114.00	89	0	30	0	4	6	1900	.....do
Heron [1]	Gasoline launch	11.00	36	0	9	6	4	5	1908	Manitowoc, Wis.
Kingfisher [2]	Gasoline launch	19.00	41	1	11	0	4	0	1908	.....do
Mallard	Gasoline launch	8.00	35	0	9	0	4	2	1907	Two Rivers, Wis.
No. 1	Derrick (floating)	81.50	66	6	29	6	5	10	1903	Milwaukee, Wis.
No. 2	.....do.[4]	131.00	84	2	27	4	6	8	1908	Sturgeon Bay, Wis.
No. 3	Derrick (floating) (with portable hand derrick).	44.00	80	0	20	0	4	9	1901	Oshkosh, Wis.
No. 4	Derrick (floating) (with portable hand derrick).	44.00	80	0	20	0	4	9	1901	.....do
No. 1	Pile driver (floating)	111.00	66	4	21	4	6	6	1894	Sheboygan, Wis.
No. 2	.....do	118.00	60	0	25	4	6	6	1906	Sturgeon Bay, Wis.
No. 2	Quarterboat (accommodations for 18 people).	25.00	70	0	18	3	3	6	1911	Kaukauna, Wis.
Delivery scow	Steel superstructure, flat scow, with conveyor for dredge Oshkosh.	42.00	31	4	(5)		(6)		1905	Green Bay, Wis.
No. 2	Wood superstructure, flat scow, with conveyor for dredge Oshkosh.	42.00	40	0	16	0	3	0	1905	.....do
No. 4	150-ton flat scow	78.00	78	0	22	0	8	0	1898	Kewaunee, Wis.
No. 7	280-ton flat scow	67.00	84	2	27	4	6	8	1911	.....do
No. 8	100-ton flat scow	30.75	60	0	21	0	5	0	1913	.....do
Eureka No. 2	65-ton flat scow (with pile driver).	27.00	70	0	18	0	4	0	1910	Kaukauna, Wis.
No. 5	25-ton flat scow	12.00	50	0	16	0	3	0	1904	Oshkosh, Wis.
No. 6	.....do	14.00	50	0	16	0	3	0	1903	.....do
No. 1	3-ton flat work scow	2.60	30	0	10	0	2	8	1909	Kaukauna, Wis.
No. 2	.....do	2.60	30	0	10	0	2	8	1910	.....do
No. 1	65-cubic yard side-dump scow.	35.00	70	6	18	0	6	2	1917	.....do
No. 2	.....do	35.00	70	6	18	0	6	2	1917	.....do
No. 7	280-cubic yard center-dump scow.	230.00	117	4	26	0	9	0	1914	Kewaunee, Wis.
No. 8	.....do	230.00	117	4	26	0	9	0	1914	.....do
No. 5	1-ton open scow	.28	14	0	4	0	1	8	1906	Kaukauna, Wis.
No. 6	.....do	.23	14	0	4	0	1	8	1910	.....do
No. 7	.....do	.23	14	0	4	0	1	8	1917	.....do
No. 8	.....do	.54	18	0	5	6	1	8	1912	.....do
No. 9	.....do	.54	18	0	5	6	1	8	1912	.....do
No. 2	20-ton pontoon scow	14.00	40	0	14	5	3	2	1908	.....do
No. 3	.....do	14.00	40	0	14	5	3	2	1908	.....do
No. 4	.....do	14.00	40	0	14	5	3	2	1910	.....do
Berlin	80-ton barge	26.00	81	2	18	6	4	2	1906	Oshkosh, Wis.
Kaukauna	200-ton barge	78.00	132	0	26	6	5	7	1912	Kaukauna, Wis.
Montello	80-ton barge	24.00	80	0	18	0	4	0	1908	Green Bay, Wis.
Riprap	850-ton barge	230.00	140	0	34	0	10	9	1911	Sturgeon Bay, Wis.

MOBILE, ALA.

Name or number.	Type.	Displacement in long tons.	Length.		Beam.		Depth.		When.	Where.
Charleston	Sea-going hopper dredge.	800.00	122	6	30	0	19	8	1891	Brooklyn, N. Y.
Gulfport	Hydraulic pipe-line dredge.	886.00	150	0	40	0	11	6	1913	Baltimore, Md.
Pascagoula	.....do	771.00	150	0	40	0	10	6	1909	.....do
Wahalak	.....do	886.00	150	0	40	0	11	6	1910	.....do

[1] Name changed from gasoline launch No. 3 in 1911.

[2] Name changed from gasoline launch No. 2 in 1911.

[3] Including machinery.

[4] Concrete mixer on scow.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

MILWAUKEE, WIS.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	$7,135.00	$6,500.00	Good..	$3,651.38	Fox River improvement.
......	....	...do...	7,675.00	3,500.00	...do...	611.08	Do.
......	....	...do...	1,540.00	850.00	...do...	4.02	Harbors, west shore of Lake Michigan.
......	....	...do...	1,960.00	1,600.00	...do...	146.88	Do.
1907	Two Rivers, Wis	...do...	1,080.00	500.00	Fair...	224.05	Do.
1906	Milwaukee, Wis.	...do...	[8]3,500.00	[8]2,500.00	...do...	100.12	Do.
1906	Sturgeon Bay, Wis.	...do...	5,625.00	3,400.00	...do...	299.08	Do.
......	....	...do...	2,000.00	1,500.00	Good..	702.76	Fox River improvement.
......	....	...do...	2,000.00	1,650.00	...do...	....	Do.
1896	Sheboygan, Wis.	...do...	3,450.00	1,500.00	...do...	6.66	Harbors, west shore of Lake Michigan.
1906	Waukegan, Ill...	...do...	4,840.00	2,600.00	...do...	137.72	Do.
......	....	...do...	1,675.00	1,350.00	...do...	2.10	Fox River improvement.
......	....	...do...	5,000.00	2,900.00	...do...	1,108.00	Do.
......	....	...do...	3,250.00	2,900.00	...do...	943.01	Do.
......	....	...do...	3,943.00	1,150.00	Fair...	....	Harbors, west shore of Lake Michigan.
......	....	...do...	2,800.00	1,700.00	Good..	....	Do.
......	....	...do...	1,929.36	1,350.00	...do...	....	Do.
......	....	...do...	1,555.00	1,550.00	...do...	536.35	Fox River improvement.
......	....	...do...	890.00	550.00	Fair...	17.33	Do.
......	....	...do...	890.00	500.00	...do...	4.17	Do.
......	....	...do...	86.71	65.00	...do...	4.33	Do.
......	....	...do...	153.98	60.00	...do...	....	Do.
......	....	...do...	3,466.37	3,466.37	Good..	....	Do.
......	....	...do...	3,597.17	3,597.17	...do...	....	Do.
......	....	...do...	7,780.43	4,500.00	...do...	133.23	Harbors, west shore of Lake Michigan.
......	....	...do...	7,780.43	4,500.00	...do...	133.23	Do.
......	....	...do...	27.42	10.00	Poor..	....	Fox River improvement.
......	....	...do...	19.50	13.00	Fair...	....	Do.
......	....	...do...	73.66	73.66	Good..	....	Do.
......	....	...do...	46.07	50.00	...do...	15.42	Do.
......	....	...do...	46.08	30.00	...do...	....	Do.
......	....	...do...	876.71	[7]1,050.00	...do..	72.80	Do.
......	....	...do...	876.71	[7]1,050.00	...do...	72.79	Do.
......	....	...do...	720.70	525.00	Fair...	8.67	Do.
......	....	...do...	2,075.00	1,000.00	Good..	....	Do.
......	....	...do...	5,000.00	3,781.00	...do...	360.05	Do.
......	....	...do...	2,014.00	1,100.00	...do...	32.63	Do.
......	....	...do...	10,950.00	7,000.00	...do...	373.72	Harbors, west shore of Lake Michigan.

MOBILE, ALA.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
......	....	Wood.	$65,000.00	$60,000.00	Good..	$4,487.65	Mobile Bar, Horn Island Pass and Ship Island Pass.
1914	Baltimore, Md..	Steel..	168,446.00	166,900.00	...do..	9,376.51	Gulfport Harbor, Miss.
......	....	...do..	143,500.00	132,500.00	...do..	17,026.80	Harbors on coast of Mississippi.
1910	Baltimore, Md..	...do..	159,000.00	156,400.00	...do..	19,322.48	Mobile Harbor, Ala.

[5] Width: Forward, 16 feet 4 inches; aft, 33 feet.

[6] Depth: Forward, 2 feet; aft, 4 feet.

[7] Includes betterments.

TABLE 3.—*Statement of floating plant owned by the United States and*

MOBILE, ALA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	in.	Ft.	in.	Ft.	in.		
Humphreys, Chas.	Hydraulic pipe-line dredge.	234.00	129	9	32	0	8	9	1908	Mobile, Ala
No. 6[1]	do	91.00	122	7	24	0	5	0	1903	Tuscaloosa, Ala
McCalla, R. C.	Stern-wheel snag boat	180.00	119	6	28	3	5	0	1909	Jeffersonville, Ind
Pearl	do	128.00	96	6	26	0	5	0	1903	Mobile, Ala
Tombigbee	do	180.00	119	0	28	0	5	4	1909	Jeffersonville, Ind
Vienna	do	152.00	117	6	26	0	4	6	1911	Pascagoula, Miss
Demopolis	Nonpropelling steam capstan snag boat.	96.00	82	2	25	7	4	0	1891	Mobile, Ala
Escatawpa	Capstan snag boat	62.00	60	0	20	0	4	0	1910	Hattiesburg, Miss
"C"	Derrick boat	29.00	46	0	32	0	3	6	1900	Tuscaloosa, Ala
Tallahatta	do	81.25	50	0	40	0	5	0	1912	do
Chickasaw	Steam dispatch boat	155.00	109	0	18	8	9	9	1908	Pensacola, Fla
Harding, Horace	Steam tugboat	215.00	90	6	23	1	10	6	1909	Pascagoula, Miss
Tuscaloosa	do	212.00	92	0	23	0	8	0	1908	do
Nugent	Stern-wheel towboat	191.00	141	3	24	6	4	3	1904	Jeffersonville, Ind
Biloxi	Gasoline launch	25.00	40	0	13	0	4	7	1909	Gulfport, Miss
Dauphin	do	58.70	80	4½	17	1½	4	6	1913	do
Jordan	do	8.50	32	4	9	8	3	2	1905	Pascagoula, Miss
Leaf	do	4.50	32	0	7	6	4	0	1907	Morris Heights, N. Y
Mamie K	do	2.00	25	0	6	0	2	7	1892	do
Mulberry	do	2.62	35	0	6	0	3	0	1911	do
Rettig	do	25.00	40	9	12	3	4	6	1914	Pascagoula, Miss
No. 1	do	2.00	17	0	5	5	2	4		
Sylph	Gasoline towboat	38.00	84	6	16	5	2	9	1900	Demopolis, Ala
Ulkanush	Stern-wheel towboat	40.00	78	6	16	6	3	5½	1916	Pascagoula, Miss
"A"[2]	Quarter boat	34.00	45	0	24	0	5	0	1904	Tuscaloosa, Ala
"B"	do	33.00	60	0	24	0	3	4	1904	do
"D"[3]	do	83.00	70	0	25	0	5	9	1904	Mobile, Ala
"N"	do	65.00	75	6	22	6	5	2	1914	Pascagoula, Miss
"O"	do	65.00	75	6	22	6	5	2	1914	do
"Q"[4]	do	88.00	70	0	25	0	5	9	1904	Mobile, Ala
No. 1	200-ton barge	51.00	90	5	24	0	5	11	1902	Tuscaloosa, Ala
No. 3	do	51.00	90	5	24	0	5	11	1902	do
No. 4	do	51.00	90	5	24	0	5	11	1902	do
No. 5	do	51.00	90	5	24	0	5	11	1903	do
No. 11	115-ton barge	22.00	60	5	22	0	5	3	1904	Pascagoula, Miss
No. 12	200-ton barge	51.00	90	5	24	0	5	11	1905	Tuscaloosa, Ala
No. 13	do	51.00	90	5	24	0	5	11	1905	do
No. 14	do	51.00	90	5	24	0	5	5	1906	do
No. 17	150-ton barge	44.00	70	6	24	0	6	3	1905	Pascagoula, Miss
No. 18	do	45.00	70	8	24	1	6	3	1906	do
No. 19	170-ton barge	55.00	75	9	25	1	6	8	1906	do
No. 20	200-ton barge	51.00	90	5	24	0	5	11	1907	Tuscaloosa, Ala
No. 21	do	51.00	90	5	24	0	5	11	1907	do
No. 22	do	51.00	90	0	24	0	5	0	1907	do
No. 23	do	51.00	90	5	24	0	5	11	1908	do
No. 27	180-ton barge	60.00	75	0	25	0	6	0		
No. 29	300-ton barge	103.00	100	4	24	0	7	0	1916	Tuscaloosa, Ala
No. 30	do	94.00	100	4	24	0	7	0	1917	do
"C"	40-ton barge	16.00	54	0	18	0	3	0	1909	Pascagoula, Miss
"D"	do	16.00	54	1	18	1	3	3	1909	do

[1] Steel barge No. 6 converted into 8-inch dredge.

[2] Hull of old 8-inch dredge converted into quarter boat.

[4] Barge No. 10 converted into quarter boat.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

MOBILE, ALA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	$46,600.00	$25,000.00	Good..	$5,388.27	Black Warrior, Warrior, and Tombigbee Rivers, Ala.
......	....	Composite	3,600.00	3,000.00	...do..	215.03	Do.
1909	Jeffersonville, Ind	Wood.	19,000.00	10,000.00	...do..	1,636.56	Do.
......	....	...do..	3,250.00	2,000.00	Bad...	364.86	Pearl River, Miss.
......	....	...do..	19,000.00	9,500.00	Good..	168.45	Tombigbee River, Ala.
......	....	...do..	11,342.00	6,000.00	...do..	594.30	Tombigbee Rive Ala. and Miss.
......	....	...do..	4,087.00	3,800.00	Fair...	3,320.97	Do.
......	....	...do..	3,246.00	1,100.00	...do..	506.69	Leaf River, Miss.
......	....	...do..	1,700.00	100.00	Bad...	4.23	Black Warrior and Tombigbee Rivers, Ala.
......	....	...do..	6,822.00	2,500.00	Fair...	1,539.38	Do.
......	....	Steel..	27,500.00	20,000.00	Good..	831.14	Mobile Harbor, Ala.
1910	Mobile, Ala.....	Wood.	22,500.00	17,000.00	Fair...	1,033.93	Do.
1908	.....do..........	...do..	21,500.00	19,000.00	Good..	1,994.58	Harbors on coast of Mississippi.
1905	Louisville, Ky..	...do..	19,000.00	10,000.00	...do..	2,328.65	Black Warrior and Tombigbee Rivers, Ala.
......	....	...do..	3,215.00	2,000.00	Poor..	391.69	Harbors on coast of Mississippi.
......	....	...do..	17,200.00	15,000.00	Good..	902.48	Mobile Harbor, Ala.
1909	Pascagoula, Miss.	...do..	600.00	500.00	Fair...	361.78	Pascagoula River, Miss.
1907	Morris Heights, N. Y.	...do..	2,350.00	1,000.00	Poor..	383.04	Mobile Harbor, Ala.
1892	Mobile, Ala.....	...do..	1,000.00	100.00	Bad...	97.85	Black Warrior and Tombigbee Rivers, Ala.
1912	Morris Heights,	...do..	3,000.00	1,600.00	Fair...	652.497	Do.
......	....	...do..	4,685.33	4,000.00	Good..	232.0	Gulfport Harbor, Ship Island Pass, Pascagoula Harbor.
......	....	...do..	250.00	240.00	Fair...	....	Mobile Bar, Horn Island Pass, Ship Island Pass.
1906	Demopolis, Ala.	...do..	2,500.00	1,700.00	...do..	735.36	Black Warrior and Tombigbee Rivers, Ala.
......	....	...do..	7,353.81	6,800.00	Good..	452.99	Black Warrior, Warrior and Tombigbee Rivers, Ala.
......	....	...do..	2,000.00	500.00	Fair...	27.59	Black Warrior and Tombigbee Rivers, Ala.
......	....	...do..	2,200.00	700.00	...do..	586.82	Do.
1905	Mobile, Ala.....	...do..	1,500.00	2,200.00	Good..	1.34	Do.
......	....	...do..	2,110.13	1,000.00	...do..	84.75	Tombigbee River, Ala. and Miss.
......	....	Wood.	2,117.41	1,000.00	...do..	84.75	Leaf River, Miss.
1905	Mobile, Ala.....	...do..	1,500.00	2,300.00	...do..	490.19	Black Warrior and Tombigbee Rivers, Ala.
......	....	...do..	1,900.00	2,400.00	...do..	1,974.83	Do.
......	....	...do..	1,900.00	1,800.00	...do..	500.70	Do.
......	....	...do..	1,900.00	1,800.00	...do..	2.12	Do.
......	....	...do..	1,900.00	1,800.00	...do..	292.81	Do.
1905	Mobile, Ala.....	...do..	1,495.00	700.00	Fair...	358.42	Do.
......	....	...do..	2,500.00	1,700.00	Good..	4.51	Do.
......	....	...do..	2,300.00	1,700.00	...do..	18.30	Do.
......	....	...do..	2,300.00	2,200.00	...do..	730.49	Do.
1905	Moss Point, Miss.	...do..	1,630.00	800.00	Fair...	513.47	Do.
1906	.....do..........	...do..	2,000.00	1,400.00	...do..	1,218.91	Do.
1907	Mobile, Ala.....	...do..	2,050.00	700.00	...do..	....	Do.
......	....	...do..	2,200.00	1,700.00	Good..	29.06	Do.
......	....	...do..	2,000.00	1,700.00	...do..	4.49	Do.
......	....	...do..	2,200.00	400.00	Bad...	50.00	Do.
......	....	...do..	2,200.00	1,700.00	Good..	....	Do.
1913	Oakchia, Ala....	...do..	500.00	800.00	Fair...	331.60	Do.
......	....	Steel..	9,529.91	9,250.00	Good..	....	Do.
......	....	...do..	10,959.39	10,900.00	...do..	....	Do.
......	....	Wood.	600.00	150.00	Fair...	....	Pearl River, Miss.
......	....	...do..	600.00	150.00	...do..	....	Tombigbee River, Ala.

---

[1] Barge No. 8, which was formerly barge No. 9, converted into quarter boat; pulled out Dec. 20, 1915, launched Feb. 9, 1916.

TABLE 3.—*Statement of floating plant owned by the United States and*

MOBILE, ALA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
"E"	340-ton barge	104.00	91 0	27 2	8 0	1909	Pascagoula, Miss
"G"	....do	104.00	91 0	27 2	8 0	1910	Gulfport, Miss
"H"	64-ton barge	23.00	54 0	18 0	4 0	1910	....do
"J"	40-ton barge	60.00	54 0	18 0	3 0	1911	Pascagoula, Miss
"K"	42-ton barge	12.00	45 0	15 0	4 0	1912	....do
"L"	340-ton barge	104.00	91 0	27 2	8 0	1913	....do
"M"	63-ton barge	17.00	54 0	18 0	3 0	1914	....do
"P"	80-ton barge	35.00	62 0	18 0	4 9	1915	....do
Caucus	Sea-going hopper dredge	1,980.00	200 0	41 0	23 2	1905	Greensport, L. I
Pettus [1]	Stern-wheel hydraulic dredge.	488.00	135 0	35 0	6 6	1908	Gulfport, Miss.; Montgomery, Ala.
Blackwater	Nonpropelling hydraulic dredge.	465.00	110 0	32 0	10 7	1911	Pine Barren, Fla
Muscogee [2]	....do	309.00	120 0	30 0	7 6	1904	Bainbridge, Ga
Upatoi [3]	Dipper dredge	212.00	85 0	30 0	6 0	1901	Columbus, Ga
Attalla [4]	....do	206.00	75 0	26 4	5 6	1902	Lock 4, Coosa River.
Twining, Wm. J	Sternwheel steam snagboat.	370.00	155 0	33 0	5 3	1881	Mobile, Ala
Chattahoochee	....do	283.00	163 0	27 0	4 0	1896	Burdocks Landing, Ala.
Flint [5]	....do	138.00	110 0	25 4	4 3	1914	Pine Barren, Fla
Choctawhatchee	....do	197.00	90 0	22 0	3 6	1902–3	....do
Escambia [6]	....do	112.00	92 0	25 0	4 0	1885	Montgomery, Ala
Conecuh [7]	Nonpropelling snagboat	37.00	60 0	20 0	3 0	1907	River Falls, Ala
Alabama [8]	Sternwheel towboat	219.00	156 5	26 4	4 4	1913–14	Pine Barren, Fla
Leota [9]	....do	167.00	137 0	27 8	4 6	1888	Gadsden, Ala
Columbus	....do	231.00	154 0	28 0	4 0	1904	Bainbridge, Ga
Coosa	Gasoline towboat	123.00	95 0	18 6	4 9	1910–11	Near Lock 3, Ala
Arrow	Gasoline launch	2.00	31 0	7 0	4 0	1910	Fort Pickens, Fla
Eufaula	....do	.75	27 6	7 3	2 4	1905	St. Joseph, Mich
Etowah	....do	2.00	25 6	6 6	2 10	(1)	Unknown
Oostenaula	....do	2.00	25 0	6 0	3 2	1911	St. Joseph, Mich
Vernon	....do	1.00	15 0	4 0	1 9	1913	Racine, Wis
Catoma	Kerosene launch	2.00	25 0	7 3	2 0	1907	St. Joseph, Mich
Santa Rosa	Auxiliary schooner	64.00	70 0	16 0	8 0	1908	Pensacola Navy Yard.
Shearwater	Gasoline launch	4.00	40 0	8 0	6 0	1908	....do
Coot	....do	1.50	21 0	4 7	2 0	1911	Fort Pickens, Fla
Primary	....do	1.25	18 5	5 0	2 0	1905	Greensport, L. I
Sub Rosa	....do	.80	14 0	4 0	1 8	1908	Pensacola Navy Yard.

[1] Hull built at Gulfport, Miss.; cabin at Montgomery, Ala.
[2] Formerly Dredge No. 4.
[3] Rebuilt 1909-10, Columbus, Ga.; formerly dredge No. 1.
[4] Formerly dredge No. 3.
[5] Rebuilt 1914 at Pine Barren, Fla.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

MOBILE, ALA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	$3,649.00	$2,000.00	Poor..	....	Harbors on coast of Mississippi.
......	....	...do..	4,100.00	4,000.00	Fair...	$299.21	Mobile Harbor, Ala.
......	....	...do..	1,421.00	1,500.00	Good..	87.93	Do.
......	....	...do..	880.00	175.00	Fair...	....	Tombigbee River, Ala. and Miss.
......	....	...do..	680.00	700.00	Good..	138.89	Mobile Harbor, Ala.
......	....	...do..	4,090.00	4,000.00	...do..	....	Gulfport Harbor, Miss.
......	....	...do..	765.86	650.00	...do..	211.86	Mobile Harbor, Ala.
......	....	...do..	1,523.12	1,500.00	...do..	....	Gulfport Harbor, Ship Island Pass, Pascagoula Harbor.
1905	Greensport, L. I.	...do..	150,000.00	100,000.00	Fair...	1,963.66	Harbor at Pensacola, Fla.
......	....	...do..	62,352.25	42,000.00	Good..	921.90	Alabama River, Ala.
......	....	...do..	63,289.23	60,000.00	...do..	11,341.65	Narrows in Santa Rosa Sound, Fla.; Blackwater River, Fla.; channel from Apalachicola River to St. Andrews Bay, Fla.
1904	Bainbridge, Ga..	...do..	12,900.00	16,525.82	...do..	1,395.57	Chattahoochee River, Ga. and Ala.
......	....	...do..	15,717.74	13,502.68	...do..	428.58	Do.
......	....	...do..	10,000.00	8,000.00	...do..	474.60	Operating and care of canals, etc., Coosa River, Ga. and Ala.
......	....	...do..	22,500.00	20,000.00	...do..	10,256.80	Alabama River, Ala.
......	....	...do..	12,000.00	14,250.00	...do..	289.91	Chattahoochee River, Ga. and Ala.
......	....	...do..	4,500.00	13,286.82	...do..	98.38	Flint River, Ga.
......	....	...do..	5,400.00	4,500.00	...do..	132.37	Choctawhatchee River, Fla. and Ala.
......	....	...do..	3,500.00	4,000.00	...do..	155.72	Escambia and Conecuh Rivers, Fla. and Ala.
......	....	...do..	1,250.00	808.00	...do..	31.02	Do.
1895	Louisville, Ky..	...do..	15,000.00	26,232.72	...do..	3,028.44	Alabama River, Ala.
1892	Gadsden, Ala...	...do..	6,000.00	8,000.00	...do..	71.16	Coosa River, Ga. and Ala., between Rome, Ga. and Lock 4, Ala.
1904	Bainbridge, Ga..	...do..	20,700.00	9,500.00	Fair...	1,154.38	Chattahoochee River, Ga. and Ala.
......	....	...do..	10,674.76	7,000.00	Good..	607.43	Coosa River, Ga. and Ala., Locks and Dams Nos. 4 and 5.
......	....	...do..	1,960.00	1,500.00	...do..	289.86	Harbor at Pensacola, Fla.
1905	St. Joseph, Mich	...do..	950.00	475.00	Fair...	....	Chattahoochee River, Ga. and Ala.
1910	Columbus, Ga...	...do..	175.00	100.00	...do..	48.20	Coosa River, Ga. and Ala., lock and dam at Mayos Bar, Ga.
1911	St. Joseph, Mich	...do..	886.00	600.00	Good..	473.96	Coosa River, Ga. and Ala., Locks and Dams Nos. 4 and 5.
1913	Racine, Wis.....	...do..	205.00	150.00	...do..	.40	Choctawhatchee River, Fla. and Ala.
1907	St. Joseph, Mich	...do..	1,225.00	500.00	Fair...	17.50	Alabama River, Ala.
......	Pensacola Navy Yard.	...do..	21,423.98	21,000.00	Good..	414.39	Harbor at Pensacola, Fla.
1912	.....do..........	...do..	900.00	2,500.00	...do..	717.82	Channel from Apalachicola River to St. Andrews Bay, Fla.
......	....	...do..	387.00	250.00	...do..	....	Do.
1905	Greensport, L. I.	...do..	([10])	250.00	...do..	....	St. Andrews Bay, Fla., and St. Josephs Bay, Fla.
1908	Pensacola Navy Yard.	...do..	([10])	150.00	...do..	41.00	Harbor at Pensacola, Fla.

[6] Rebuilt 1909 at Pine Barren, Fla.
[7] Formerly barge No. 22, fitted up as hand-power snagboat 1910.
[8] Formerly John Mills, rebuilt 1914.
[9] Rebuilt 1903 at Lock, Ala.
[10] Unknown.

TABLE 3.—*Statement of floating plant owned by the United States and*

MOBILE, ALA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Chipola	Gasolene launch	7.00	42	0	8	6	7	0	1900	Apalachicola, Fla
Carp	do	2.00	24	8	5	0	2	0	(1)	Unknown
No. 4 [2]	Pile-driver barge	12.00	40	0	18	0	3	0	1904	Columbus, Ga
No. 5 [2]	do	12.00	40	0	18	0	3	0	1904	do
No. 11	do	30.00	80	0	22	0	4	2	1907	Mobile, Ala
No. 17 [3]	do	10.00	40	0	18	0	3	0	1904	Columbus, Ga
No. 26 [4]	do	10.00	40	0	18	0	3	0	1910	do
No. 15 [5]	Clamshell derrick barge	30.00	80	0	22	0	4	2	1907	Gulfport, Miss.; Lock 3, Ala.
No. 8	100-ton barge	30.00	80	0	22	0	4	2	1906	Mobile, Ala
No. 9 [6]	110-ton barge	110.00	70	0	30	0	4	9	1908	Columbus, Ga
No. 18	10-ton barge	8.50	30	0	10	0	1	8	1903	Burdocks Landing, Ala.
No. 19 [2]	250-ton barge	82.00	125	0	28	0	5	2	1903	Bainbridge, Ga
No. 20	do	82.00	125	0	28	0	5	2	1903	do
No. 21 [7]	30-ton barge	17.50	40	0	18	0	3	0	1907	Columbus, Ga
No. 22 [8]	120-ton barge	50.00	64	0	22	6	4	4	1913	Freeport, Fla
No. 23	110-ton barge	40.00	80	0	29	0	5	0	1894	Pensacola, Fla
Nos. 26 to 39	Wooden pontoons	1.00	16	0	4	0	1	9	1909	Montgomery, Ala
Letters A to U, inclusive (omitting letter I).	Steel pontoons		16	0	6	0	1	10	1915	Roanoke, Va
Nos. 40 to 59, inclusive.	do		12	10	4	10	1	6	1915	Newnan, Ga
No. 24	110-ton barge	35.00	72	0	27	0	5	0	1895	Pensacola, Fla
No. 34	50-ton barge	18.00	50	0	20	0	4	0	1911	Mayos Bar, Rome, Ga.
No. 10	100-ton barge (creosoted)	30.00	80	0	22	0	4	2	1907	Mobile, Ala
No. 12	do	30.00	80	0	22	0	4	2	1907	do
No. 13	do	30.00	80	0	22	0	4	2	1907	do
No. 14	do	30.00	80	0	22	0	4	2	1907	Gulfport, Miss
No. 27	300 ton barge (creosoted)	82.00	124	0	28	0	7	0	1910	New Orleans, La
No. 28	do	82.00	124	0	28	0	7	0	1910	do
No. 29	do	82.00	124	0	28	0	7	0	1910	do
No. 30	do	82.00	124	0	28	0	7	0	1910	do
No. 32	do	92.50	130	0	26	0	6	0	1911	Near Lock 3, Coosa River.
No. 33 [10]	do	92.50	130	0	26	0	6	0	1911	Lock 3, Ala
No. 31	300-ton barge, carbolineum.	87.00	125	0	28	0	7	0	1910	Columbus, Ga
No. 1	Quarterboat	23.00	50	0	20	0	3	7	1906	Mobile, Ala
No. 43	70-ton barge	70.00	100	0	26	0	5	3	1913	Pine Barren, Fla
No. 44	do	70.00	100	0	26	0	5	3	1913	do
No. 45	80-ton barge	40.00	80	0	24	0	4	0	1915	Apalachicola, Fla
No. 46 [11]	Drilling barge	40.00	80	0	24	0	4	0	1915	do
No. 2	Quarterboat	23.00	50	0	20	0	3	7	1906	Mobile, Ala
No. 3	do	26.00	60	0	16	0	2	0	1907	River Falls, Ala

---

[1] Unknown.

[2] Rebuilt 1910 at Columbus, Ga.

[3] Formerly rock barge; pile driver 1910, Columbus, Ga.; pile-driver machinery removed 1912.

[4] Pile-driver machinery removed 1912.

[5] Framed and creosoted, Gulfport, Miss.; completed at Lock 3, Ala.

[6] Formerly Dredge Albany; dismantled in 1917.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

MOBILE, ALA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1916	Apalachicola, Fla.	Wood.	$500.00	$857.78	Good.	$252.72	Chattahoochee River, Ga. and Ala.
1915	Albany, Ga.	...do..	81.00	65.00	Poor..	43.97	Flint River, Ga.
		...do..	375.00	285.00	Fair...		Chattahoochee River, Ga. and Ala.
		...do..	375.00	285.00	..do..		Do.
1907	Mobile, Ala.	...do..	2,975.00	1,200.00	Good..		Alabama River, Ala.
		...do..	300.00	190.00	Poor..		Flint River, Ga.
		...do..	375.00	287.75	Fair...		Chattahoochee River, Ga. and Ala.
1907	Gulfport, Miss.	...do..	4,007.50	2,500.00	Good..	653.41	Operating and care of canals, etc., Coosa River, Ga. and Ala.
1906	Mobile, Ala.	...do...	1,703.00		Worthless.		Alabama River, Ala.
		...do...	(1)	200.00	Poor..		Flint River, Ga.
		...do...	300.00		Worthless.		Do.
		...do...	4,000.00	3,270.90	Good..	943.05	Chattahoochee River, Ga. and Ala.
		...do...	4,000.00	2,507.48	...do...	139.45	Do.
		...do...	450.00	285.00	Fair...		Do.
		...do...	971.60	950.00	Good..		Choctawhatchee River, Fla. and Ala.
1896	Pensacola, Fla.	...do...	1,350.00		Worthless.		National defense (war)—gun and mortar batteries.
		...do...	[9] 57.00	10.00	Poor..		Alabama River, Ala.
1915	Roanoke, Va.	Steel..	[9] 99.90	90.00	Good..		Do.
1915	Newnan, Ga.	...do...	[9] 79.10	77.12	...do...		Chattahoochee River, Ga. and Ala.
1898	Pensacola, Fla.	Wood.	1,850.00		Worthless.		National defense (war)—gun and mortar batteries.
		...do...	499.37	200.00	Fair...		Coosa River, Ga. and Ala., lock and dam at Mayos Bar, Ga.
1907	Mobile, Ala.	...do...	2,975.00	1,200.00	Good..		Alabama River, Ala.
1907	.....do	...do...	2,975.00	1,200.00	...do...		Do.
1907	.....do	...do...	2,975.00	1,200.00	...do...		Do.
1907	Gulfport, Miss	...do...	4,007.50	2,500.00	...do...		Operating and care of canals, etc., Coosa River, Ga. and Ala.
1910	New Orleans, La	...do...	4,151.60	3,000.00	...do...		Alabama River, Ala.
1910	.....do	...do...	4,151.60	3,000.00	...do...		Do.
1910	.....do	...do...	4,251.44	3,040.00	...do...		Chattahoochee River, Ga. and Ala.
1910	.....do	...do...	4,251.44	3,040.00	...do...		Do.
		...do...	6,377.88	3,400.00	...do...		Coosa River, Ga. and Ala., Locks and Dams Nos. 4 and 5.
		...do...	6,750.00	3,400.00	...do...		Do.
		...do...	9,165.98	6,416.00	...do...		Chattahoochee River, Ga. and Ala.
1906	Mobile, Ala.	...do...	1,590.00	500.00	Poor..		Alabama River, Ala.
		...do...	6,855.33	3,000.00	Good..		Do.
		...do...	6,855.33	3,000.00	...do...		Do.
1915	Apalachicola, Fla.	...do...	2,750.00	2,612.50	...do...		Flint River, Ga.
1915	.....do	...do...	2,750.00	2,945.00	...do...		Do.
1906	Mobile, Ala.	...do...	1,590.00	500.00	Poor..		Alabama River, Ala.
		...do...	1,000.00	300.00	...do...		Escambia and Conecuh Rivers, Fla. and Ala.

[7] Rebuilt 1908, Apalachicola, Fla.

[8] Formerly nonpropelling snagboat Geneva; dismantled in 1917.

[9] Each.

[10] Built by United States Engineer Department.

[11] Formerly 80-ton barge; converted into drilling barge, 1915.

TABLE 3.—*Statement of floating plant owned by the United States and*

MOBILE, ALA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 4	Quarter boat	48.00	70	0	21	6	8	0	1907	Columbus, Ga
No. 16 [1]	do	60.00	68	0	26	0	5	0	1903	Bainbridge, Ga
No. 25 [2]	do	120.00	80	0	29	0	5	0	1894	Pensacola, Fla
Thronateeska [3]	do	54.00	75	0	26	0	4	6	1903	Bainbridge, Ga
No. 5	Quarterboat on pontoons	40.00	81	4	27	9	5	2	1915	Columbus, Ga
No. 6	do	18.00	61	0	21	6	5	0	1915	Mayos Bar, Rome, Ga.
No. 42	140-ton barge	45.00	80	0	22	0	5	0	1912	Mayos Bar, Ga
No. 36	79-ton barge	79.00	60	0	32	0	4	0	1912	Pine Barren, Fla
No. 37	128-ton barge	128.00	88	0	32	0	8	0	......	Pensacola Navy Yard.
No. 38	do	128.00	88	0	32	0	8	0	......	do
No. 39	do	128.00	88	0	32	0	8	0	......	do
No. 40	162-ton barge	162.00	105	0	32	0	8	0	......	do
No. 41	98-ton barge	98.00	90	0	30	0	6	0	1912	New Orleans, La
No. 47	Houseboat on pontoons	20.00	56	0	20	0	4	6	1913	Wetappo Creek, Fla.

NASHVILLE, TENN.

Name or number.	Type.	Displacement in long tons.	Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Sevier	Dipper dredge	200.00	80	0	30	0	7	0	1903	Jeffersonville, Ind
Tishomingo	Dredge (bucket)	481.00	107	0	44	0	5	5	1912	Muscle Shoals Canal
No. 1	Snag boat	67.00	89	6	25	0	3	4	1910	Lock 7, Cumberland River.
Warioto	Stern-wheel towboat	235.00	141	0	27	0	5	1	1915	Dubuque, Iowa
John	do	32.00	100	6	18	9	3	3	1903	Jeffersonville, Ind
Henry	do	34.00	101	3	18	6	2	1	1903	do
White Oak	Gasoline towboat	96.00	115	0	23	6	3	6	1905	do
Hiwassee	Stern-wheel towboat	135.00	115	5	22	11	3	10	1908	Muscle Shoals Canal
Eudora	Gasoline launch (screw)	1.00	21	8	5	5	2	4	......	......
Harpeth	do	1.25	26	4	6	1	2	3	1913	Salem, Ohio
Mansker	do	.50	20	0	4	9	1	7	1913	Leavenworth, Ind
No. 1	Gasoline tender	56.25	86	3	19	2	1	6	1910	Lock 7, Cumberland River.
No. 3	Derrick boat	144.00	80	6	30	4	4	6	1909	Lock 3, Cumberland River.
No. 4	do	43.30	70	0	32	0	4	7	1912	Lock A, Cumberland River.
No. 5	do	43.30	90	0	32	0	4	7	1913	do
No. 8	do	115.00	80	6	30	0	4	6	1915	Chattanooga, Tenn
No 14	do	83.00	80	0	30	0	4	0	1913	do
No. 1	Quarter boat	28.00	60	10	18	6	2	6	1908	Lock 2, Cumberland River.
No. 2	do	30.00	65	0	14	0	2	6	1907	do
No. 3	do	22.00	60	9	14	0	3	3	1913	Lock 21, Cumberland River.
No. 4	do	24.70	61	0	18	0	3	2	1915	Lock A, Cumberland River.
No. 5	80-cubic yard dump scow	52.00	73	7	20	8	5	9	1916	do
No. 6	do	52.00	73	7	20	8	5	9	1916	do
No. 5	Barge, 112-ton	36.00	90	0	18	0	4	0	1914	do
No. 6	do	35.00	89	9	18	0	4	0	1914	do
No. 10	do	60.00	100	0	22	0	5	0	1909	Muscle Shoals Canal, Tennessee River.

[1] Rebuilt 1910, Columbus, Ga.

[2] Formerly with dredging outfit; machinery removed and barge converted into quarterboat, 1910.

[3] Formerly snagboat with capstan; rebuilt at Pine Barren, Fla., 1914.

[4] Hull worthless; machinery good; new hull being built.

employed in the Engineer Department at large on Dec. 31, 1917—**Continued.**

MOBILE, ALA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where						
......	....	Wood.	$2,500.00	....	Worthless.	....	Chattahoochee River, Ga. and Ala.
......	....	...do...	2,960.00	$3,562.50	Good..	....	Flint River, Ga.
1896	Pensacola, Fla..	...do...	1,850.00	2,500.00	...do...	$1,385.60	Gun and mortar batteries, Pensacola, Fla.
1903	Bainbridge, Ga..	...do...	7,460.00	4,750.00	...do...	....	Flint River, Ga.
......	....	...do...	1,673.30	1,918.10	...do...	....	Chattahoochee River, Ga. and Ala.
......	....	...do...	1,335.76	1,000.00	...do...	....	Coosa River, Ga. and Ala., between Rome, Ga., and Lock 4, Ala.
......	....	...do...	2,421.15	1,000.00	Fair...	....	Coosa River, Ga. and Ala., lock and dam at Mayos Bar, Ga.
......	....	...do...	4,347.03	4,000.00	Good..	....	Channel from Apalachicola River to St. Andrews Bay, Fla.
1912	Pensacola Navy Yard.	...do...	7,000.00	5,000.00	...do...	2,955.42	St. Andrews Bay, Fla.
1912	.....do..........	...do...	7,000.00	8,500.00	...do...	2,922.00	R. and P. defenses, Pensacola, Fla., sea walls and buildings.
1912	.....do..........	...do...	7,000.00	5,200.00	...do...	3,059.16	Do.
1912	.....do..........	...do...	8,000.00	7,500.00	...do...	3,555.05	Do.
......	....	...do...	4,861.13	4,500.00	...do...	553.13	Channel from Apalachicola River to St. Andrews Bay, Fla.
......	....	...do...	650.60	1,449.49	...do...	736.99	Flint River, Ga.

NASHVILLE, TENN.

When.	Where	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
......	....	Wood.	$18,650.00	$5,500.00	(4)	$6,971.89	Cumberland River.
1917	Nashville, Tenn.	...do ..	37,068.00	16,115.00	Poor..	670.05	Do.
......	....	...do ..	3,018.27	1,494.00	Fair...	271.68	Do.
......	....	(5)	36,525.00	30,789.00	Good .	1,364.78	Do.
......	....	Wood.	4,535.00	2,565.00	Fair...	302.09	Do.
......	....	...do ..	4,535.00	2,550.00	...do ..	224.86	Do.
1917	Nashville, Tenn.	...do ..	[6] 2,500.00	2,775.00	...do ..	764.32	Do.
1917	.....do..........	...do ..	9,616.92	3,203.00	Good .	[7] 6.25	Do.
1913	.....do..........	(8)	300.00	50.00	Bad...	....	Do.
1913	Salem, Ohio.....	Steel..	1,285.00	600.00	Poor..	465.32	Do.
1913	Leavenworth, Ind	Wood.	173.80	50.00	Bad...	26.17	Do.
......	....	...do ..	3,918.51	850.00	Fair...	66.16	Do.
......	....	...do ..	5,500.00	1,000.00	...do ..	223.17	Do.
......	....	...do ..	6,267.86	3,418.00	...do ..	25.97	Do.
......	....	...do ..	7,267.86	4,540.00	Good .	19.00	Do.
......	....	...do ..	[6] 6,401.72	7,486.00	...do ..	....	Do.
......	....	...do ..	7,871.43	5,214.00	Fair...	....	Do.
......	....	...do ..	Unknown.	50.00	Poor..	....	Do.
......	....	...do ..	1,198.71	....	Bad...	63.05	Do.
......	....	...do ..	1,282.78	1,000.00	Good .	412.67	Do.
......	....	...do ..	1,591.84	1,093.00	...do ..	19.19	Do.
......	....	...do ..	2,542.53	1,527.60	Fair...	....	Do.
......	....	...do ..	2,862.19	1,909.00	...do ..	....	Do.
......	....	...do ..	1,652.04	688.00	Good .	....	Do.
......	....	...do ..	1,717.43	715.00	...do ..	51.96	Do.
......	....	...do ..	2,569.30	....	Worthless.	....	Do.

[5] Metal and wood.

[6] Rebuilt by United States.

[7] Does not include repairs made prior to transfer from Chattanooga district.

[8] Galvanized iron.

TABLE 3.—*Statement of floating plant owned by the United States and*

NASHVILLE, TENN.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 13	Barge, 200-ton	58.60	100 0	22 0	5 0	1911	Lock A, Cumberland River.
No. 14	.....do	58.60	100 0	22 0	5 0	1911	.....do
No. 15	.....do	58.60	100 0	22 0	5 0	1912	.....do
No. 16	.....do	58.60	100 0	22 0	5 0	1912	.....do
No. 17	Barge, 90-ton	25.80	50 0	20 0	5 0	1912	.....do
No. 20	.....do		64 0	16 0	4 0		
No. 21	.....do		64 0	16 0	4 0		
No. 22	.....do		65 0	16 0	4 0		
No. 86	Barge, 222-ton	44.00	100 0	24 6	4 11	1916	Chattanooga, Tenn.
No. 87[1]	.....do	44.00	100 0	24 6	4 11	1917	.....do
No. 1	Barge, 200-ton	58.60	100 0	22 0	5 0	1917	Fox Bluff, Tenn.
No. 2	.....do	58.60	100 0	22 0	5 0	1917	.....do
No. 1	Pontoon sand and gravel washer.		36 0	9 0	4 0		

NEW LONDON, CONN.

Name or number.	Type.	Displacement in long tons.	Length.	Beam.	Depth.	When.	Where.
Ellis	Gasoline launch (screw).	7½	33 0	9 2	3 1	1911	Marblehead, Mass.
Katharine	.....do	2½	30 5	7 11	3 11	1909	South Norwalk, Conn.
Pequot	.....do	2½	28 3	7 4	4 6	1912	New London, Conn.

NEW ORLEANS, LA.

Name or number.	Type.	Displacement in long tons.	Length.	Beam.	Depth.	When.	Where.
Benyaurd	Hydraulic dredge	2,978	271 6	47 6	23 0	1900 1904	Richmond, Va. Norfolk, Va.
New Orleans	.....do	4,775	315 0	50 0	26 0	1912	Qunicy, Mass.
Delatour	Hydraulic dredge and snag boat.	390	112 0	30 0	5 0	1908-9	Jeffersonville, Ind.
Grossetete	Bucket dredge	258	80 4	34 2½	5 0	1913	New Orleans, La.
Pigeon[2]	Snag boat	65	60 0	30 6	6 0	([3])	Moss Point, Miss.
Tonty[4]	Steam yacht	120	96 0	16 0	5 6	1886	New York, N. Y.
Reese General	Steam launch	29	48 0	13 6	5 0	1876	New Orleans, La.
Donovan, C.	Steam tug	180	95 0	20 10	10 0	1895	Newport News, Va.
Uacha[5]	.....do	43	62 0	14 0	7 6	1878	Philadelphia, Pa.
Pickett	Survey boat (steam)	32	52 5	12 6	6 3	1905	New Orleans, La.
Hyacinth[6]	Steam boat (paddle)	75	102 6	18 0	2 6	1904	Patterson, La.
Amite	Gasoline launch	1.21	20 11	4 6	2 9	1912	New Orleans, La.
Balize	.....do	11	41 6	12 3	4 9	1917	Plaquemine, La.
Boeuf	.....do	1	14 0	4 5	2 8	1913	New Orleans, La.
Calcasieu	.....do	5.6	37 10	10 8½	4 0	1915	Plaquemine, La.
Maurepas	.....do	15	36 6½	10 6½	4 0	1915	Plaquemine Lock, La.
Salvador	.....do	13.8	41 0	9 6	4 0	1906	Muskegon, Mich.
Stadia	.....do	5	30 4	6 7	2 11	1894	New York, N. Y.
Vermilion	.....do	15	45 6	13 5½	5 9	1917	Plaquemine Lock, La.
Choupique	Quarter boat	75	67 8	28 6	4 3	1916	Keystone Lock, La. (Bayou Teche).

[1] This barge now being converted into a sand and gravel pump boat.

[2] Formerly barge No. 23, changed to steam derrick No. 2. Machinery installed in 1914 at Plaquemine, La., at a cost of $1,700. Rebuilt in 1915 at Keystone Lock, and then used as a derrick barge.

[3] Unknown.

mployed in the Engineer Department at large on Dec. 31, 1917—Continued.

NASHVILLE, TENN.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$3,046.11	$500.00	Fair...		Cumberland River.
		...do..	3,046.11	500.00	...do..		Do.
		...do..	3,020.67	1,200.00	...do..	$505.13	Do.
		...do..	2,661.86	750.00	...do..		Do.
		...do..	1,843.34	577.00	...do..		Do.
1917	Nashville, Tenn.	...do..	700.00	500.00	Poor..		Do.
1917	.....do..........	...do..	700.00	500.00	...do..		Do.
1917	.....do..........	...do..	800.00	600.00	Fair...	141.86	Do.
1917	.....do..........	...do..	2,606.68	2,344.00	Good.		Do.
1917	.....do..........	...do..	2,980.04		...do..		Do.
		...do..	3,303.14	2,994.00	...do..		Do.
		...do..	3,203.26	2,883.00	...do..		Do.
1917	Nashville, Tenn.	...do..	800.00	500.00	Poor..		Do.

NEW LONDON, CONN.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1914	Boston, Mass....	Wood.	$2,100.00	$1,200.00	Good.	$345.44	
1909	Darien, Conn...	...do..	775.00	500.00	Fair...	51.14	
1912	New London, Conn.	...do..	1,800.00	900.00	Good.	195.52	

NEW ORLEANS, LA.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
}		Steel..	$414,288.37	$204,000.00	Good..	$20,363.56	Southwest Pass, Mississippi River.
		...do..	520,101.69	460,000.00	...do...	8,650.20	Do.
		Wood.	35,566.86	20,000.00	Poor..		Various works in New Orleans, La., district.
		...do..	16,951.07	15,834.00	Good..	2,534.06	Do.
	New Orleans, La	...do..	3,050.00	2,500.00	Poor..		Do.
1897	New York, N. Y.	Steel..	18,900.00	15,000.00	Fair...	1,594.44	Passes of Mississippi River.
		Wood.	3,500.00	1,000.00	...do..	142.96	South Pass, Mississippi River.
1906	Punta Gorda, Fla.	Steel..	29,000.00	25,000.00	...do..	1,234.75	Southwest Pass, Mississippi River.
1901	Port Eads, La..	Iron...	10,000.00	6,000.00	...do..	1,766.50	South Pass, Mississippi River.
		Wood.	7,189.00	4,000.00	Poor..	565.08	Southwest Pass, Mississippi River.
1905	Patterson, La...	...do..	8,000.00	4,000.00	...do..	3,300.91	Removing water hyacinth in Mississippi, Louisiana and Texas.
1912	New Orleans, La	...do..	500.00		...do..		Various works in New Orleans, La., district.
		...do..	4,510.95	4,500.00	Good..	100.76	South Pass, Mississippi River.
1913	NewOrleans, La.	...do..	325.00	275.00	...do..	4.67	Removing water hyacinths in Mississippi, Louisiana and Texas.
		...do..	2,193.00	1,800.00	...do..	86.00	Various works, tender to dredge Grossetete.
		...do..	2,115.16	1,800.00	...do..	69.90	Various works, tender to dredge Delatour.
1914	Morgan City, La.	Steel..	1,700.00	1,900.00	...do..	1,926.36	Bayou Plaquemine and Plaquemine Lock, La.
1894	New York, N. Y	Wood.	1,844.50	500.00	Poor..	11.00	Schooner Bayou Lock, La.
		...do..	5,248.09	5,200.00	Good..	27.10	Various works in New Orleans, La., district.
		...do..	3,000.00	2,700.00	...do..		Various works; auxiliary to dredge Grossetete.

---

[4] Formerly No. 150, 372, Chere Amie. Hull rebuilt in New Orleans, La., in 1905 and new boiler and engine installed in 1913.

[5] Formerly No. 115, 599, Startle. New boiler installed in 1913 at New Orleans, La.

Rebuilt in 1906 at New Orleans, La.

TABLE 3.—*Statement of floating plant owned by the United States and*

NEW ORLEANS, LA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Lacassine	Quarter boat	9.4	30	0	15	0	3	4	1915	Plaquemine, La.
Intracoastal	do	56	65	6	22	6	4	5	1914	New Orleans, La.
No. 1 [1]	Steam pile driver	71	55	0	25	0	4	0	1896	Port Eads, La.
No. 2	Steam pile driver and derrick.	127	75	6	30	0	5	0	1909-10	Westlake, La.
No. 1 [2]	Steam derrick	78	63	0	24	0	5	0	1903	Port Eads, La.
No. 3	do	100	75	6	30	0	5	9	1917	New Orleans, La.
Chene [3]	Spraying barge	25	50	0	16	0	4	0	1915	Keystone Lock, La.
No. 1	Fuel barge	63	50	0	20	0	4	2½	1914	New Orleans, La.
No. 2	do	28	50	0	20	0	5	0	1915	Keystone Lock, La.
No. 3	do	35.4	50	0	22	0	5	0	1912	Moss Point, Miss.
No. 4	do	12	50	0	22	8	5	0	1917	Plaquemine Lock, La.
No. 5 [4]	do	27	40	8	14	3	5	0	1912	Plaquemine, La.
No. 6	do	10	35	0	14	0	4	0	1916	Keystone Lock, La.
No. 6	Decked barge	55	100	0	22	0	5	0	1905	New Orleans, La.
No. 9	do	55	100	0	22	0	5	0	1905	Madisonville, La.
No. 10	do	55	100	0	22	0	5	0	1905	do
No. 11	do	55	100	0	22	0	5	0	1906	Unknown
No. 13	do	137	90	0	27	0	8	0	1904	Pearlington, Miss.
No. 14	do	137	90	0	27	0	8	0	1904	do
No. 15	do	126	90	0	27	0	8	0	(7)	Unknown
No. 16	do	55	100	0	22	0	5	0	1910	New Orleans, La.
No. 17	do	80	100	0	22	0	5	6	1910	do
No. 18	do	80	100	0	22	0	5	6	1910	do
No. 19	do	80	100	0	22	0	5	6	1910	do
No. 20	do	80	100	0	22	0	5	6	1910	do
No. 21	do	55	100	0	22	0	5	0	1910	do
No. 22	do	55	100	0	22	0	5	0	1910	do
No. 24	do	80	100	0	24	0	6	0	(7)	do
No. 26	do	55	100	0	22	0	5	0	1915	do
No. 27	do	55	100	0	22	0	5	0	1915	do
No. 28	do	80	100	0	22	0	5	6	1917	do
No. 29	do	80	100	0	22	0	5	6	1917	do
No. 30	do	80	100	0	22	0	5	6	1917	do
No. 31	do	80	100	0	22	0	5	6	1917	do
No. 32	do	80	100	0	22	0	5	6	1917	do

NEW ORLEANS. LA. (FOURTH MISSISSIPPI RIVER DISTRICT).

Name or number.	Type.	Displacement in long tons.	Length *Ft.*	Length *in.*	Beam *Ft.*	Beam *in.*	Depth *Ft.*	Depth *in.*	When.	Where.
The Ram	Hydraulic dredge	419	125	0	30	0	7	6	1893	Jeffersonville, Ind.
B-1	Levee building machine.	341	110	0	40	0	7	3	1908	New Orleans, La.
B-2	do	442	110	0	42	0	7	6	1914	do
B-3	do	442	110	0	42	0	7	6	1915	do
B-6	do	(10)							1917	do
Newton, Gen. John	Stern-wheel towboat	221	175	0	24	0	7	6	1899	Dubuque, Iowa
Plaquemine	do	300	136	0	29	6	5	6	1910	Jeffersonville, Ind.
Lafourche	do	300	136	0	29	6	5	6	1911	New Orleans, La.
Chalmette	do	132	105	0	21	0	5	0	1915	Jeffersonville, Ind.

[1] Rebuilt in 1910 at New Orleans, La.

[2] Rebuilt in 1903 at New Orleans, La.

[3] Formerly spraying barge No. 1.

[4] Formerly quarterboat No. 1.

[5] Condemned and destroyed.

[6] Condemned and destroyed May 28, 1917.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

NEW ORLEANS, LA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	$578.00	$500.00	Good..	....	Various works in New Orleans, La., district.
......	....	..do..	3,757.00	3,000.00	...do..	....	Do.
......	....	..do..	5,457.47	4,000.00	...do..	$2,339.25	South Pass, Mississippi River.
......	....	..do..	9,192.06	6,000.00	...do..	312.97	Southwest Pass, Mississippi River.
......	....	..do..	3,550.00	2,500.00	...do..	564.06	South Pass, Mississippi River.
......	....	..do..	9,555.38	9,555.38	...do..	....	Southwest Pass, Mississippi River.
......	....	..do..	791.00	650.00	...do..	....	Removing water hyacinths in Louisiana.
......	....	..do..	591.00	425.00	...do..	....	Various works; snag boat Pigeon.
......	....	..do..	909.00	800.00	...do..	....	Various works; dredge Grossetete.
1912	New Orleans, La.	..do..	1,242.50	900.00	...do..	....	Auxiliary to dredge Delatour; various work.
......	....	..do..	969.07	969.00	...do..	....	Do.
1914	Florence, Miss..	..do..	450.00	....	(8)	....	
......	....	..do..	700.00	650.00	Good.	....	Various works.
......	....	..do..	2,250.00	1,200.00	...do..	33.90	South Pass, Mississippi River.
......	....	..do..	2,800.00	900.00	...do..	45.85	Do.
......	....	..do..	2,800.00	....	(8)	....	
......	....	..do..	2,800.00	....	(8)	....	
1906	New Orleans, La	..do..	4,500.00	....	Poor..	....	Southwest Pass, Mississippi River.
1906	.....do..........	..do..	4,500.00	....	...do..	....	Do.
1906	.....do..........	..do..	5,000.00	....	...do..	....	Do.
1906	.....do..........	..do..	2,410.50	....	(8)	....	
......	....	..do..	2,410.50	1,500.00	Good..	288.86	Southwest Pass, Mississippi River.
......	....	..do..	2,410.50	1,500.00	...do..	208.86	Do.
......	....	..do..	2,410.50	1,500.00	...do..	208.86	Do.
......	....	..do..	2,410.50	1,500.00	...do..	208.86	Do.
......	....	..do..	2,462.40	1,400.00	...do..	95.62	South Pass, Mississippi River.
......	....	..do..	2,462.40	1,200.00	...do..	....	Do.
1910	New Orleans, La.	..do..	1,200.00	....	(9)	....	
......	....	..do..	2,824.80	2,000.00	Good..	....	South Pass, Mississippi River.
......	....	..do..	2,824.80	2,000.00	...do..	....	Do.
......	....	..do..	3,993.23	3,993.00	...do..	....	Southwest Pass, Mississippi River.
......	....	..do..	3,993.23	3,993.00	...do..	....	Do.
......	....	..do..	3,993.23	3,993.00	...do..	....	Do.
......	....	..do..	3,993.23	3,993.00	...do..	....	Do.
......	....	..do..	3,993.23	3,993.00	...do..	....	Do.

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER DISTRICT).

......	....	Steel..	$69,500.00	$75,000.00	Good..	$3,805.00	Improving Atchafalaya and Red Rivers, etc., Louisiana.
......	....	Wood.	30,316.00	30,000.00	...do..	1,444.29	Improving Mississippi River, fourth Mississippi River district.
......	....	Steel..	40,680.00	40,000.00	...do...	4,460.29	Do.
......	....	..do...	54,233.00	54,000.00	...do...	4,659.15	Do.
......	....	..do...	82,000.00	82,000.00	...do...	....	Do.
......	....	..do...	29,138.00	29,000.00	...do...	3,067.00	Do.
......	....	..do...	38,700.00	38,000.00	...do...	1,880.00	Do.
......	....	..do...	39,000.00	39,000.00	...do...	2,030.95	Do.
......	....	..do...	19,425.00	19,000.00	...do...	1,421.00	Do.

[7] Unknown.

[8] Lost in hurricane of Sept. 28, 1917.

[9] Condemned May 29, 1917, and destroyed.

[10] Uses same hull as B-3.

TABLE 3.—*Statement of floating plant owned by the United States and*

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER DISTRICT)—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Teche	Stern-wheel tow boat	90	100 0	20 4	5 0	1911	Jeffersonville, Ind.
Tensas	do	73	93 6	20 4	4 6	1905	Chicago, Ill.
Tickfaw	Tugboat	217	94 0	20 4	10 0	1900	Philadelphia, Pa.
Morganza	do	180	94 0	20 4	10 3	1892	do
Tunica	do	205	90 0	20 4	9 8	1898	Baltimore, Md.
Marengo	do	137	80 0	18 2	8 8	1892	do
Manchac	do	113	78 0	17 0	7 6	1886	Paducah, Ky.
No. 1	Hydraulic grader	236	124 0	30 0	7 7	1900	New Orleans, La.
No. 2	do	236	124 0	30 0	7 7	1910	do
No. 1	Floating steam derrick	142	100 0	30 0	4 9	1908	do
No. 2	do	128	100 0	30 0	4 9	1910	do
No. 3	do	128	100 0	30 0	4 9	1912	do
Paver No. 1	Floating concrete mixer	367	124 0	30 0	7 7	1915	do
Beatrice	Gasoline launch	2.8	30 0	6 6	3 2	1906	St. Louis, Mo.
Neptune	do	3.3	32 0	5 4	3 6	1913	New Orleans, La.
New Orleans	Quarter boat	237	166 0	30 0	4 3	1889	do
Natchez	do	198	140 0	30 0	4 0	1908	do
Baton Rouge	do	198	140 0	30 0	4 0	1910	do
St. Joseph	do	198	140 0	30 0	4 0	1910	do
Bayou Sara	do	198	140 0	30 0	4 0	1911	do
Bayou Goula	do	198	140 0	30 0	4 0	1911	do
Donaldsonville	do	187	100 0	30 0	4 0	1915	do
Vidalia	do	187	100 0	30 0	4 0	1917	do
Port Hudson	do	68	80 0	22 0	4 4	1911	do
Torras	do	68	80 0	22 0	4 4	1911	do
Lake Borgne	do	68	80 0	22 0	4 4	1910	do
Olga	do	68	80 0	22 0	4 4	1914	do
Dry Dock	Floating, ordinary type	225	103 0	30 0	8 0	1912	do
Cement Barge No. 1	Floating warehouse	108	124 0	30 0	7 7	1915	do
Cement Barge No. 2	do	108	124 0	30 0	7 7	1915	do
No. 1	Decked barge	98	124 0	30 0	7 7	1908	do
No. 2	do	98	124 0	30 0	7 7	1908	do
No. 3	do	98	124 0	30 0	7 7	1908	do
No. 4	do	98	124 0	30 0	7 7	1910	do
No. 5	do	98	124 0	30 0	7 7	1904	Pascagoula, Miss.
No. 6	do	98	124 0	30 0	7 7	1904	do
No. 7	do	98	124 0	30 0	7 7	1904	do
No. 8	do	98	124 0	30 0	7 7	1903	New Orleans, La.
No. 9	do	98	124 0	30 0	7 7	1904	Pascagoula, Miss.
No. 10	do	98	124 0	30 0	7 7	1900	Elizabeth, Pa.
No. 11	do	98	124 0	30 0	7 7	1900	do
No. 12	do	98	124 0	30 0	7 7	1903	Pascagoula, Miss.
No. 13	do	98	124 0	30 0	7 7	1900	Elizabeth, Pa.
No. 14	do	98	124 0	30 0	7 7	1910	New Oreleans, La.
No. 15	do	98	124 0	30 0	7 7	1910	do
No. 16	do	98	124 0	30 0	7 7	1910	do
No. 17	do	98	124 0	30 0	7 7	1910	do
No. 18	do	98	124 0	30 0	7 7	1910	do
No. 19	do	98	124 0	30 0	7 7	1905	do
No. 20	do	98	124 0	30 0	7 7	1908	do
No. 21	do	98	124 0	30 0	7 7	1908	do
No. 22	do	98	124 0	30 0	7 7	1907	do
No. 23	do	98	124 0	30 0	7 7	1907	do
No. 24	do	98	124 0	30 0	7 7	1907	do
No. 25	do	98	124 0	30 0	7 7	1908	do
No. 26	do	98	124 0	30 0	7 7	1906	do
No. 27	do	98	124 0	30 0	7 7	1907	do
No. 28	do	98	124 0	30 0	7 7	1910	do
No. 29	do	98	124 0	30 0	7 7	1911	do
No. 30	do	98	124 0	30 0	7 7	1910	do
No. 31	do	98	124 0	30 0	7 7	1912	Ambridge, Pa.
No. 32	do	98	124 0	30 0	7 7	1912	do
No. 33	do	98	124 0	30 0	7 7	1903	Pascagoula, Miss.
No. 34	do	98	124 0	30 0	7 7	1903	do
No. 35	do	98	124 0	30 0	7 7	1903	do
No. 36	do	98	124 0	30 0	7 7	1904	do
No. 37	do	98	124 0	30 0	7 7	1904	do
No. 38	do	98	124 0	30 0	7 7	1904	do
No. 39	do	98	124 0	30 0	7 7	1904	do

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER DISTRICT)—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Steel..	$16,850.00	$16,000.00	Good..	$903.04	Improving Mississippi and and Red Rivers, etc., Louisana.
		...do...	11,120.00	11,000.00	...do...	3,388.31	Do.
1911	New York, N. Y.	...do...	29,500.00	29,000.00	...do...	3,218.00	Do.
1902	....do..........	...do...	30,000.00	29,000.00	...do...	2,111.00	Do.
1898	Baltimore, Md..	...do...	22,000.00	22,000.00	...do...	1,554.76	Do.
1902	....do..........	...do...	15,000.00	15,000.00	...do...	2,435.17	Do.
1887	Paducah, Ky...	Wood.	6,555.00	6,000.00	...do...	2,804.00	Do.
		...do...	23,880.00	23,000.00	...do...	1,764.00	Do.
		...do...	24,217.00	24,000.00	...do...	893.00	Do.
		...do...	7,500.00	7,000.00	...do...	150.00	Do.
		...do...	5,583.00	5,000.00	...do...	451.00	Do.
		...do...	6,280.00	6,000.00	...do...	544.00	Do.
		...do...	12,684.00	12,000.00	...do...	1,290.00	Do.
		...do...	1,750.00	225.00	...do...	66.46	Do.
1913	New Orleans, La.	...do...	1,800.00	1,000.00	...do...	549.00	Do.
		...do...	10,000.00	10,000.00	...do...	1,213.00	Do.
		...do...	9,000.00	9,000.00	...do...	646.00	Do.
		...do...	10,000.00	10,000.00	...do...	592.00	Do.
		...do...	10,000.00	10,000.00	...do...	274.41	Do.
		...do...	10,000.00	10,000.00	...do...	403.00	Do.
		...do...	10,000.00	10,000.00	...do...	371.16	Do.
		...do...	9,373.00	9,000.00	...do...	....	Do.
		...do...	15,143.00	15,000.00	...do...	....	Do.
		...do...	3,500.00	3,000.00	...do...	97.00	Do.
		...do...	3,500.00	3,000.00	...do...	89.93	Do.
		...do...	3,500.00	3,000.00	...do...	....	Do.
		...do...	3,500.00	3,000.00	...do...	....	Do.
		...do...	5,000.00	5,000.00	...do...	110.00	Do.
		...do...	5,104.00	5,000.00	...do...	141.13	Do.
		...do...	5,104.00	5,000.00	...do...	162.00	Do.
		...do...	4,250.00	4,000.00	...do...	35.63	Do.
		...do...	4,250.00	4,000.00	...do...	225.00	Do.
		...do...	4,250.00	4,000.00	...do...	....	Do.
		...do...	4,400.00	4,000.00	...do...	800.00	Do.
		...do...	4,400.00	4,000.00	...do...	....	Do.
		...do...	4,400.00	4,000.00	...do...	116.85	Do.
		...do...	4,400.00	4,000.00	...do...	45.37	Do.
		...do...	4,000.00	4,000.00	...do...	179.00	Do.
		...do...	4,400.00	4,000.00	...do...	800.00	Do.
		...do...	3,800.00	3,000.00	Fair...	....	Do.
		...do...	3,800.00	3,000.00	...do...	1,800.00	Do.
		...do...	4,000.00	4,000.00	Good..	22.00	Do.
		...do...	3,800.00	3,000.00	Fair...	....	Do.
		...do...	4,400.00	4,000.00	Good..	....	Do.
		...do...	4,400.00	4,000.00	...do...	140.00	Do.
		...do...	4,400.00	4,000.00	...do...	30.00	Do.
		...do...	4,400.00	4,000.00	...do...	....	Do.
		...do...	4,400.00	4,000.00	...do...	135.00	Do.
		...do...	4,675.00	4,000.00	...do...	5.06	Do.
		...do...	4,250.00	4,000.00	...do...	71.98	Do.
		...do...	4,250.00	4,000.00	...do...	90.00	Do.
		...do...	4,725.00	4,700.00	...do...	2.45	Do.
		...do...	4,725.00	4,700.00	...do...	49.92	Do.
		...do...	4,725.00	4,700.00	...do...	208.00	Do.
		...do...	4,250.00	4,250.00	...do...	57.69	Do.
		...do...	4,675.00	4,600.00	...do...	101.30	Do.
		...do...	4,725.00	4,700.00	...do...	90.00	Do.
		...do...	4,400.00	4,400.00	...do...	56.00	Do.
		...do...	4,000.00	4,000.00	...do...	....	Do.
		...do...	4,400.00	4,400.00	...do...	164.07	Do.
		Steel..	7,950.00	7,950.00	...do...	....	Do.
		...do..	7,950.00	7,950.00	...do..	48.00	Do.
		Wood.	4,000.00	4,000.00	...do..	308.50	Do.
		...do..	4,000.00	4,000.00	...do..	170.00	Do.
		...do..	4,000.00	4,000.00	...do..	270.15	Do.
		...do..	4,400.00	4,400.00	...do..	206.34	Do.
		...do..	4,000.00	4,000.00	...do..	....	Do.
		...do..	4,400.00	4,400.00	...do..	13.64	Do.
		...do..	4,400.00	4,400.00	...do..	105.29	Do.
		...do..	4,000.00	4,000.00	...do..	375.17	Do.

TABLE 3.—*Statement of floating plant owned by the United States and*

NEW ORLEANS, LA., FOURTH MISSISSIPPI RIVER DISTRICT—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 40	Decked barge	98	124	0	30	0	7	7	1904	Pascagoula, Miss.
No. 41	do	98	124	0	30	0	7	7	1904	do
No. 42	do	98	124	0	30	0	7	7	1904	do
No. 43	do	98	124	0	30	0	7	7	1906	New Orleans, La.
No. 44	do	98	124	0	30	0	7	7	1907	do
No. 45	do	98	124	0	30	0	7	7	1907	do
No. 46	do	98	124	0	30	0	7	7	1908	do
No. 47	do	98	124	0	30	0	7	7	1908	do
No. 48	do	98	124	0	30	0	7	7	1909	do
No. 49	do	98	124	0	30	0	7	7	1909	do
No. 50	do	98	124	0	30	0	7	7	1917	do
No. 51	do	98	124	0	30	0	7	7	1909	do
No. 52	do	98	124	0	30	0	7	7	1909	do
No. 53	do	98	124	0	30	0	7	7	1909	do
No. 54	do	98	124	0	30	0	7	7	1910	do
No. 55	do	98	124	0	30	0	7	7	1911	do
No. 56	do	98	124	0	30	0	7	7	1911	do
No. 57	do	98	124	0	30	0	7	7	1912	do
No. 58	do	98	124	0	30	0	7	7	1912	do
No. 59	do	98	124	0	30	0	7	7	1912	do
No. 60	do	98	124	0	30	0	7	7	1912	do
No 61	do	98	124	0	30	0	7	7	1913	do
No. 62	do	98	124	0	30	0	7	7	1913	do
No. 63	do	98	124	0	30	0	7	7	1913	do
No. 64	do	98	124	0	30	0	7	7	1913	do
No. 65	do	98	124	0	30	0	7	7	1913	do
No. 66	do	98	124	0	30	0	7	7	1913	do
No. 67	do	98	124	0	30	0	7	7	1915	Jeffersonville, Ind.
No. 68	do	98	124	0	30	0	7	7	1916	New Orleans, La.
No. 69	do	98	124	0	30	0	7	7	1916	do
No. 70	do	98	124	0	30	0	7	7	1916	do
No. 71	do	98	124	0	30	0	7	7	1916	do
No. 72	do	98	124	0	30	0	7	7	1917	do
No. 73	do	98	124	0	30	0	7	7	1917	do
No. 74	do	98	124	0	30	0	7	7	1917	do
No. 75	do	98	124	0	30	0	7	7	1917	do
No. 76	do	98	124	0	30	0	7	7	1917	do
No. 77	do	98	124	0	30	0	7	7	1917	do
No. 78	do	98	124	0	30	0	7	7	1917	do
No. 79	do	98	124	0	30	0	7	7	1917	do
No. 80	do	98	124	0	30	0	7	7	1917	do
No. 81	do	98	124	0	30	0	7	7	1917	do
No. 82	do	98	124	0	30	0	7	7	1917	do
No. 83	do	98	124	0	30	0	7	7	1917	do
No. 84	do	98	124	0	30	0	7	7	1917	do
No. 85	do	98	124	0	30	0	7	7	1917	do

NEWPORT, R. I., DISTRICT.

Name or number.	Type.	Displacement in long tons.	Length *Ft.*	Length *in.*	Beam *Ft.*	Beam *in.*	Depth *Ft.*	Depth *in.*	When.	Where.
Monomoy	Gasoline launch (screw)	62	82	9	15	6	9	6	1914	Muskegon, Mich
Gazelle	do	73	66	5	18	2	10	7	1896	Noank, Conn.
U. S. Engineers	do	6.30	30	0	6	5	3	2	1893	Morris Heights, N.Y.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

NEW ORLEANS, LA., FOURTH MISSISSIPPI RIVER DISTRICT—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	......	Wood.	$4,000.00	$4,000.00	Good..	......	Improving Mississippi and Red Rivers, etc., Louisiana.
......	......	...do..	4,400.00	4,400.00	...do..	$49.95	Do.
......	......	...do..	4,675.00	4,675.00	...do..	95.00	Do.
......	......	...do..	4,725.00	4,725.00	...do..	465.00	Do.
......	......	...do..	4,725.00	4,725.00	...do..	......	Do.
......	......	...do..	4,250.00	4,250.00	...do..	137.38	Do.
......	......	...do..	4,250.00	4,250.00	...do..	......	Do.
......	......	...do..	4,250.00	4,250.00	...do..	......	Do.
......	......	...do..	5,000.00	5,000.00	...do..	179.43	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	5,000.00	5,000.00	...do..	75.00	Do.
......	......	...do..	5,000.00	5,000.00	...do..	140.00	Do.
......	......	...do..	5,000.00	5,000.00	...do..	226.25	Do.
......	......	...do..	5,000.00	5,000.00	...do..	295.00	Do.
......	......	...do..	4,000.00	4,000.00	...do..	94.85	Do.
......	......	...do..	4,000.00	4,000.00	...do..	......	Do.
......	......	...do..	4,000.00	4,000.00	...do..	247.37	Do.
......	......	...do..	4,307.00	4,307.00	...do..	230.00	Do.
......	......	...do..	4,307.00	4,307.00	...do..	62.00	Do.
......	......	...do..	4,307.00	4,307.00	...do..	117.36	Do.
......	......	...do..	4,100.00	4,100.00	...do..	304.00	Do..
......	......	...do..	4,100.00	4,100.00	...do..	......	Do.
......	......	...do..	4,100.00	4,100.00	...do..	28.34	Do.
......	......	...do..	4,100.00	4,100.00	...do..	......	Do.
......	......	...do..	4,100.00	4,100.00	...do..	......	Do.
......	......	...do..	4,100.00	4,100.00	...do..	......	Do.
......	......	Steel..	8,250.00	8,250.00	...do..	72.00	Do.
......	......	Wood.	6,400.00	6,400.00	...do..	120.00	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.
......	......	...do..	6,400.00	6,400.00	...do..	......	Do.

NEWPORT, R. I., DISTRICT.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
......	......	Wood.	$29,159.55	$23,750.00	Good..	$232.02	Rivers and harbors, southeast coast of Massachusetts and Rhode Island.
1910	Block Island, R. I.	...do..	3,800.00	3,500.00	...do..	557.79	
1893	Morris Heights, N. Y.	...do..	2,090.00	270.00	Poor..	621.00	

TABLE 3.—*Statement of floating plant owned by the United States and*

NEW YORK, FIRST DISTRICT.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	in.	Ft.	in.	Ft.	in.		
Clinton De Witt	Hydraulic pipe line dredge.	383	95	0	27	6	8	6	1913	Baltimore, Md
Gillespie, Gen. G. L.	do	880	150	0	37	0	11	10	......	
No. 6, Hudson River.	Derrick boat [1]	145	85	0	28	0	8	10	1912	Albany, N. Y
No. 16, Hudson River.	do	170	80	0	26	6	6	0	1913	do
No. 19, Hudson River.	do	204	79	6	27	0	8	8	......	
No. 20, Hudson River.	do	145	81	0	27	6	8	6	1913	Albany, N. Y
No. 3, Hudson River.	Quarter boat	17	40	5	15	6	2	4	1911	New Baltimore, N. Y.
No. 41, Hudson River.	do	150	86	9	26	4	8	9	1914	Albany, N. Y
No. 44, Hudson River.	do	80	62	0	22	0	4	3	1914	do
No. 31, Hudson River.	Tugboat (steam)	35	53	0	16	2	6	11	......	
No. 45, Hudson River.	do	34	61	0	16	10	6	10	......	
No. 33, Hudson River.	Survey boat	8	39	6	9	6	6	6	......	
No. 34, Hudson River.	Inspection boat	4	32	0	5	6	2	6	......	
No. 2, Hudson River.	Survey scow	10	50	0	15	0	2	10	1911	New Baltimore, N. Y.
No. 12, Hudson River.	do	14	50	0	15	0	2	10	1913	Albany, N. Y
No. 4, Hudson River.	Piledriver [2]	32	50	0	21	9	3	1	1912	do
No. 39, Hudson River.	do	130	80	0	26	0	3	8	1915	do
No. 5, Hudson River.	Water boat [3]	32	50	0	21	7	3	2	1912	do
No. 7, Hudson River.	150-ton barge	235	85	0	28	0	8	10	1912	do
No. 9, Hudson River.	350-ton barge	80	85	0	28	0	8	10	......	
No. 10, Hudson River.	450-ton barge	90	92	0	28	6	9	6	......	
No. 11, Hudson River.	400-ton barge	85	88	6	29	6	9	6	......	
No. 13, Hudson River.	150-ton barge	200	71	0	24	0	7	0	1879	Brooklyn, N. Y
No. 15, Hudson River.	10-ton barge	4	20	0	12	0	2	0	......	
No. 17, Hudson River.	180-ton barge [4]	270	90	0	27	0	7	0	1913	Albany, N. Y
No. 22, Hudson River.	250-ton barge	90	85	6	26	6	8	6	......	
No. 23, Hudson River.	50-ton barge	18	35	0	15	6	5	0	......	
No. 26, Hudson River.	200-ton barge	72	80	0	25	0	7	0	......	
No. 27, Hudson River.	do	72	80	0	25	0	7	0	......	
No. 28, Hudson River.	do	72	80	0	25	0	7	0	......	
No. 29, Hudson River.	do	72	80	0	25	0	7	0	......	
No. 30, Hudson River.	250-ton barge	86	90	0	27	0	7	0	......	
No. 37, Hudosn River.	do	80	84	8	26	0	7	0	......	
No. 38, Hudson River.	do	80	84	8	26	0	7	0	......	
No. 40, Hudson River.	200-ton barge	70	78	0	25	6	8	0	......	
No. 42, Hudson River.	400-ton barge	120	98	6	25	11	7	0	......	
Nos. 1 to 34, Hudson River.	Rowboats	(5)	......		......		......		......	Albany, N. Y
Nos. 1 to 4, Hudson River.	Sweep floats	(5)	......		......		......		......	do
Derby, Capt. Geo. H.	Gasoline launch (screw).	15	44	0	10	0	6	0	1915	Wilmington, Del.
Sweep	Sweep and survey boat.	85	56	3	26	2	6	0	1908	New London, Conn.
"W"	Gasoline launch (screw).	......	16	4	4	8	0	10	1911	Amesbury, Mass
Wah-Ta-Wah	do	52	80	0	15	1	6	3	1911	Greenport, N. Y
Marie	do	......	29	0	8	0	4	0	1906	Unknown.
No. 25, Hudson River.	Drill boat [6]	37	34	4	15	6	4	0	1916	Albany, N. Y
No. 8.	Rowboat.	......	16	0	4	0	......		1914	New York Navy Yard.
No. 9.	do	......	16	0	4	0	......		1914	do
No. 12.	do	......	16	0	......		......		1916	Corona, Long Island.
No. 13.	do	......	16	0	......		......		1916	do
No. 14.	do	......	16	0	4	9	1	10	1917	do
No. 15.	do	......	16	0	4	9	1	10	1917	do
No. 16.	do	......	16	0	......		......		......	Unknown.
No. 17.	do	......	16	0	......		......		......	do
Nos. 1 to 6	Sweep floats.	......	25	0	9	0	2	0	1914	Albany, N. Y
No. 7.	do	......	25	0	9	0	2	0	......	Unknown.
No. 8.	do	......	25	0	9	0	2	0	......	do
Nos. 9 to 11	do	......	25	0	9	0	2	0	1912	New York, N. Y

---

[1] Formerly gravel digging and screening plant.

[2] Formerly boring scow.

[3] Formerly 50-ton barge.

[4] Formerly concrete mixing plant.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

NEW YORK, FIRST DISTRICT.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$62,825.00	$70,934.25	Good.	$18,764.89	Hudson River, N. Y.
1916	Baltimore, Md.	Steel.	157,909.00	186,871.55	do.	37,837.17	Do.
		Wood.	8,013.75	2,500.00	Fair.	162.07	Do.
		do.	11,460.10	7,058.79	do.	268.00	Do.
1913	New York, N.Y.	do.	3,800.00	1,991.44	do.	420.44	Do.
		do.	6,282.70	2,500.00	do.	298.56	Do.
		do.	455.00	429.16	do.		Do.
		do.	6,712.83	3,878.00	Good.		Do.
		do.	2,841.75	2,173.66	do.	182.37	Do.
1913	New York, N.Y.	do.	5,400.00	6,377.81	Fair.	275.06	Do.
1914	Albany, N. Y.	do.	7,000.00	6,200.68	do.	83.49	Do.
1913	North Tonawanda, N. Y.	do.	3,626.00	2,995.44	Good.	5.44	Do.
1913	do.	do.	1,823.50	958.01	Fair.	561.27	Do.
		do.	535.00	317.00	Good.		Do.
		do.	993.61	500.00	do.		Do.
		do.	2,562.07	1,500.00	Fair.		Do.
		do.	12,000.00	6,615.02	do.	535.97	Do.
		do.	3,973.00	1,484.95	do.	279.95	Do.
		do.	8,278.36	1,070.12	Good.	70.12	Do.
1912	New York, N.Y.	do.	1,470.00	1,041.73	do.	510.73	Do.
1912	do.	do.	850.00	486.00	Fair.		Do.
1912	do.	do.	1,470.00	848.12	do.	75.72	Do.
	do.	do.	Unknown.		Very poor		Do.
1913	Albany, N. Y.	do.	110.00		do.		Do.
		do.	11,313.94	1,236.99	Good.	516.99	Do.
1912	New York, N.Y.	do.	850.00	270.12	Poor.	70.12	Do.
1912	do.	do.	412.50	17.50	do.		Do.
1912	do.	do.	1,815.00	1,321.87	Good.		Do.
1912	do.	do.	1,500.00	732.12	do.	70.12	Do.
1912	do.	do.	1,500.00	617.91	Fair.	59.56	Do.
1912	do.	do.	1,815.00	980.12	Good.	70.12	Do.
1912	do.	do.	1,500.00	609.85	Fair.		Do.
1913	do.	do.	850.00	432.39	do.	335.39	Do.
1913	do.	do.	850.00	160.00	Poor.		Do.
1914	do.		1,500.00	1,003.29	Good.	123.24	Do.
1914	do.	do.	1,700.00	1,321.00	do.	350.72	Do.
[5]	Various.	do.	[5]	[5]	Fair.		Do.
[6]		do.		370.00	do.		Do.
		do.	4,561.00	4,000.00	Very good.	240.10	River and harbor works.
		do.	8,058.00	6,415.00	Good.	1,508.94	Do.
1911	New York, N.Y.	do.	216.50	5.00	Poor.	None.	Do.
		do.	15,463.00	14,813.00	Very good.	1,530.59	Do.
1907	New York, N.Y.	do.	1,100.00	500.00	Good.	94.01	Do.
		do.	412.50	985.00	do.	539.69	Do.
		do.	134.56	90.00	do.		Do.
		do.	134.18	90.00	do.		Do.
		do.	110.00	93.00	Very good.		Do.
		do.	110.00	93.00	do.		Do.
		do.	134.00	134.00	Excellent.		Do.
		do.	134.00	134.00	do.		Do.
		do.	Found.	75.00	Poor.		Do.
		do.	Found.	75.00	do.		Do.
		do.		[5]	Fair.		D9.
1914	New York, N.Y.	do.			do.		Do.
1915	do.	do.			do.		Do.
		do.			Poor.		Do.

---

[5] Various.

[6] Small drill boat constructed out of scow No. 25, using equipment on hand.

TABLE 3.—*Statement of floating plant owned by the United States and*

NEW YORK, SECOND DISTRICT.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Atlantic	Seagoing hopper dredge.	2,670	288	0	47	6	25	0	1904	Sparrows Point, Md.
Drift	Gasoline launch (screw).	½	18	0	5	0	1	0	1916	Brooklyn, N. Y
Ingalls, Gen.	.....do	8	43	0	8	4	4	9	1896	Jersey City, N. J
Manisees	Tug and survey boat, steam (screw).	225	106	0	22	0	9	0	1898	Noank, Conn
Navesink	Seagoing hopper dredge.	3,150	290	0	47	6	28	0	1908	Sparrows Point, Md.
Raritan	.....do	2,930	290	0	47	6	28	0	1908	.....do
Rockaway	Steam lighter (screw)	300	110	0	30	0	7	0	1917	Milford, Del
Schuyler	Gasoline launch (screw).	1	25	0	5	8	1	10	1902	Plattsburg, N. Y

NEW YORK (SUPERVISOR OF NEW YORK HARBOR).

Nimrod	Steam tug	245	106	11	21	7	10	8	1890	Noank, Conn
Lamont	.....do	216	108	8½	21	9½	12	6	1895	Camden, N. J
Lookout	Naphtha launch	3	30	0	6	6	3	9	1896	New York, N. Y
Scout	Steam tug	195	106	1	20	0	10	8	1896	Camden, N. J
Vigilant	.....do	208	114	5½	21	8½	12	0	1900	Elizabeth, N. J
Cerberus	.....do	226	109	3	21	10	12	6	1905	Camden, N. J

NORFOLK, VA.

Currituck	Hydraulic pipe line dredge.	805.00	150	0	37	0	11	10	1914	Baltimore, Md
Hampton	.....do	91.00	60	0	23	0	6	0	1902	Richmond, Va
No name	Dipper dredge	159.00	65	0	26	2	6	5	......	Not known
Roanoke	Snagboat and bucket dredge.	232.00	115	0	24	0	5	10	1895	Petersburg, Va
No name	Derrick boat	43.00	42	11	15	11	3	9	......	Not known
No. 14	.....do	190.00	83	11	30	5½	6	0	1916	Norfolk, Va
Chipeta	Tow and survey boat, steam (screw).	45.00	76	8	14	10	8	4	1893	Jamestown, R. I
Long Point	Gasoline launch (screw).	5.00	38	0	9	6	4	0	1912	Crittenden, Va
Millville	.....do	1.00	22	6	6	6	2	6	1913	Roanoke Island, N. C.
Munden	.....do	1.00	22	6	6	6	2	6	1913	.....do
Norva	.....do	6.50	36	10	10	6	4	3	1912	Norfolk, Va
Okisko	.....do	15.00	41	0	11	6	6	0	1914	Camden, N. J
Paquippe	.....do	65.00	82	9	15	6	9	6	1914	Muskegon, Mich
Powhatan	.....do	6.40	40	2	10	2	4	3	1910	St. Joseph, Mich
Skycoak	.....do	41.00	60	½	15	9	7	0	1914	Camden, N. J
Starvation	.....do	1.00	22	6	6	6	2	6	1913	Roanoke Island, N. C..
Coinjock	Quarterboat	72.70	80	0	22	0	4	3	1913	Norfolk, Va
Pungo	.....do	72.70	80	0	22	0	4	3	1913	.....do
No. 1	Water barge	7.40	29	0	10	0	4	0	1913	.....do

[1] Not known.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

NEW YORK—SECOND DISTRICT.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	......	Steel..	$361,500.00	$200,000.00	Good..	$2,532.47	New York Harbor, N. Y., Ambrose Channel.
......	......	Wood.	599.00	600.00	...do..	......	New York Harbor, N. Y., Ambrose Channel (surveys and drift).
1896	Jersey City, N. J.	...do..	4,500.00	3,500.00	...do..	96.88	New York Harbor, N. Y., Bay Ridge and Red Hook Channels and drift.
1900	Peacedale, R. I..	...do..	18,500.00	14,500.00	...do..	1,865.30	New York Harbor, N. Y., surveys and drift.
......	......	Steel..	384,129.28	......	......	......	New York Harbor, N. Y., Ambrose Channel.
......	......	...do..	397,600.00	275,000.00	...do..	17,038.72	Do.
......	......	Wood.	......	......	...do..	......	Not yet completed.
1902	New York, N. Y.	...do..	1,110.80	......	......	......	New York Harbor, N. Y.

NEW YORK (SUPERVISOR OF NEW YORK HARBOR).

1890	New York......	Wood.	$37,000.00	$5,000.00	Very poor.	$233.33	Prevention of deposits, harbor of New York.
......	......	Steel..	37,500.00	16,000.00	...do...	1,183.04	Do.
......	......	Wood.	1,450.00	100.00	...do...	70.00	Do.
......	......	Steel..	35,550.00	11,000.00	Poor..	1,049.93	Do.
......	......	...do...	44,700.00	20,000.00	Good..	811.60	Do.
......	......	...do...	43,740.00	25,000.00	...do...	108.55	Do.

NORFOLK, VA.

......	......	Steel.	$164,180.00	$150,000.00	Good .	$47,429.92	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
1904	Richmond, Va..	Wood.	4,800.00	1,500.00	Bad...	......	Fortifications, Fortress Monroe, Va.
......	Not known.....	...do ..	(1)	150.00	...do ..	......	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
......	......	...do ..	15,321.02	1,800.00	Fair...	494.57	Improving Roanoke River, N. C.
......	......	...do ..	(1)	450.00	Poor..	237.38	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
......	......	...do ..	17,689.19	17,689.19	Good .	......	Do.
1906	Boston, Mass....	...do ..	(1)	2,500.00	Fair ..	1,195.17	Improving James River.
1914	Hampton, Va...	...do ..	(1)	500.00	...do ..	265.95	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
1913	Manteo, N. C....	...do ..	350.00	175.00	..do ..	36.86	Do.
1913	.....do.........	...do ..	350.00	150.00	Bad...	68.60	Do.
......	......	...do ..	2,138.75	3,000.00	Good .	1,728.50	Improving harbor at Norfolk, Va.
......	......	...do ..	4,395.00	3,500.00	...do ..	91.45	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
......	......	...do ..	27,581.67	24,000.00	...do ..	3,013.68	Improving harbor at Norfolk, Va.
1911	St. Joseph, Mich.	...do ..	2,890.00	500.00	Poor..	897.73	Inland waterway, Norfolk, Va., to Beaufort Inlet N. C.
......	......	...do ..	13,487.50	13,000.00	Good .	1,863.09	Do.
1913	Manteo, N. C....	...do ..	350.00	175.00	Fair ..	130.38	Do.
......	......	...do ..	5,865.98	3,500.00	Good .	445.92	Do.
......	......	...do ..	5,865.98	3,500.00	...do ..	514.53	Do.
1915	Norfolk, Va.....	...do ..	200.00	100.00	Fair...	......	Do.

TABLE 3.—*Statement of floating plant owned by the United States and*

NORFOLK, VA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Depth.	Built. When.	Built. Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 3	Deck scow	57.00	72 6	26 6	6 9	1911	West Point Va.
No. 4	do	57.00	72 6	26 6	6 9	1911	do
No. 10	do	98.00	91 0	27 8	8 0	1914	Norfolk, Va.
No. 11	do	98.00	91 0	27 8	8 0	1914	do
No. 12	Flatboat ferry	8.00	40 0	12 0	2 6	1914	Great Bridge, Va.
No. 13	do	8.00	40 0	12 0	2 6	1914	do
No. 1	Rowboat		21 9	6 0	2 3	1888	Baltimore, Md
No. 13	do		14 8	4 5	1 11		Not known
No. 14	do		14 8	4 5	1 11		do
No. 16	do		18 8	5 5	1 7	1910	Richmond, Va.
No. 17	do		19 8	5 4	1 6	1910	do
No. 18	do		19 10	5 5	1 7	1910	do
No. 19	do		17 11	4 10	1 4	1910	do
PHILADELPHIA, PA.							
Delaware	Seagoing hopper dredge	[1]4,200	315 0	52 0	22 6	1905	Sparrows Point, Md.
Manhattan	do	4,000	288 0	47 6	25 0	1904	do
Cataract	Pipe line hydraulic dredge.	886	140 6	40 4	10 7	1905	Baltimore, Md
Rattler	Derrick boat	240	85 0	32 0	7 3	[2]1908	Camden, N. J.
Vidette	Tugboat	200	105 0	21 0	10 0	1898	Baltimore, Md
Camden	do	170	80 0	20 0	9 0	1906	Philadelphia, Pa
Philadelphia	do	55	67 0	16 0	7 6	1894	Wilmington, Del
Mifflin	Gasoline launch	49	79 10	15 0	8 10	1916	Camden, N. J
Trenton	do	4.5	28 0	8 0	3 8	1912	Holly Oak, Del
Delaware	do	2	25 0	7 7	3 1	1916	Camden, N. J
New Castle	do	1.5	24 6	7 0	2 8	1912	Pennsgrove, N. J.
Chester	Quarterboat	90	60 0	25 0	5 8	1912	Philadelphia, Pa.
Observer	do	25	50 0	20 0	4 0	1896	Camden, N. J
No. 3	Deck scow	330	78 0	26 0	9 0	1889	Brooklyn, N. Y
No. 5	Derrick scow	50	38 0	18 0	6 0	1879	New York, N. Y.
No. 6	Coal and water scow	60	50 0	20 0	6 0	1910	Camden, N. J
No. 7	Deck scow	75	60 0	20 0	6 0	1913	Philadelphia, Pa.
No. 8	Drill boat	180	70 0	30 0	7 0	1908	Camden, N. J
No. 9	Steel scow	60	74 0	26 0	7 6	1917	Trenton, N. J
No. 10	do	60	74 0	26 0	7 6	1917	do
No. 11	do	60	74 0	26 0	7 6	1917	do
No. 12	do	60	74 0	26 0	7 6	1917	do
PITTSBURGH, PA.							
Albatross [3]	Gasoline launch (screw).	1.7	31 6	7 0	2 10	1887	New York, N. Y.
Luzon	do	12	53 0	9 4	4 9	1901	do
No. 1, M. R.[4]	Dipper dredge (nonpropelling).	314	85 0	32 0	7 0	1903	Jeffersonville, Ind.
No. 2, M. R.[5]	do	197	86 6	30 0	5 0	1905	Parkersburg, W. Va.
Kittanning	Stern-wheel survey and inspection boat.	135	118 0	20 0	3 6	1915	United States Boatyard, Lock No. 4, Pa. (cabin).

[1] Displacements are light.

[2] Rebuilt in 1914.

[3] New hull July, 1913.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

NORFOLK, VA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$2,000.00	$900.00	Fair		Improving James River.
		do	2,000.00	900.00	do		Do.
		do	4,474.62	3,500.00	Good	$503.25	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
		do	4,474.62	3,500.00	do	503.25	Do.
		do	400.00	300.00	do	38.65	Do.
		do	400.00	300.00	do	14.50	Do.
1888	Baltimore, Md.	Iron	132.00	20.00	Fair		Improving James River.
1906	Boston, Mass.	Wood.	(1)	10.00	do		Do.
1906	do	do	(1)	10.00	do		Do.
		do	60.50	25.00	do		Do.
		do	63.75	25.00	do		Do.
		do	64.25	25.00	do		Do.
		do	58.00	20.00	do		Do.

PHILADELPHIA, PA.

		Steel	$392,134.00	$194,000.00	Good	$12,293.45	Delaware River, Pa. and N. J.
		do	341,577.24	172,000.00	do	30,359.40	Do.
1906	Baltimore, Md.	Wood.	80,600.00	52,000.00	do	2,382.40	Do.
		do	14,502.91	12,000.00	do	275.85	Do.
		Steel	35,100.00	24,500.00	do	2,824.39	Do.
1912	New York, N. Y.	do	30,000.00	20,500.00	do	1,495.65	Do.
		do	15,997.61	8,500.00	do	3,029.87	Do.
		Wood.	19,350.00	17,000.00	do	610.64	Do.
		do	992.00	500.00	do	68.14	Do.
		do	450.00	390.00	do	372.57	Do.
1912	New Castle, Del.	do	499.00	220.00	do		Do.
		do	3,932.00	2,300.00	do	360.35	Do.
		do	1,161.00	85.00	Poor		Do.
		do	4,000.00	350.00	do		Do.
		do	3,000.00	490.00	do	62.25	Do.
		do	2,245.00	900.00	Good		Do.
		do	3,285.00	2,000.00	do	319.11	Do.
		do	8,070.52	8,000.00	do	1,198.03	Do.
		Steel	11,000.00	11,000.00	do		Do.
		do	11,000.00	11,000.00	do		Do.
		do	11,000.00	11,000.00	do		Do.
		do	11,000.00	11,000.00	do		Do.

PITTSBURGH, PA.

1892	Cincinnati, Ohio	Wood.	$740.00	$270.00	Good	$17.24	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
1901	New York, N. Y.	do	4,660.00	500.00	Fair	126.71	Harbor at Pittsburgh, Pa.
		do	17,565.00	9,000.00	do	920.56	Monongahela River, W. Va., Locks 3, 6, etc.
1907	Pittsburgh, Pa.	do	17,000.00	1,000.00	do	316.02	Operating and care of canals and other works of navigation, indefinite, Monongahela and Ohio Rivers.
1915	Albany, Ind., (hull).	Steel	29,530.00	25,000.00	Good	1,282.26	Operating and care of canals and other works of navigation, indefinite, Monongahela, Ohio, and Allegheny Rivers.

[4] New hull and house built by United States in 1911.

[5] Second hand.

TABLE 3.—*Statement of floating plant owned by the United States and*

PITTSBURGH, PA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Slackwater[1]	Stern-wheel repair boat	242	137	8	26	10	4	4	1902	Marietta, Ohio
Swan[2]	Stern-wheel snag and repair boat.	264	159	0	31	4	4	6	1903	Pittsburgh, Pa
Roberts, T. P	Stern-wheel tow boat	206	133	2	22	10	5	0	1906	Marietta, Ohio
Deluge	Steam pump boat (nonpropelling).	171	80	0	21	0	4	2	1898	Elizabeth, Pa
No. 1, O. R	do		80	0	22	0	4	2	1910	United States Boatyard, Lock No. 4, Pa.
Monongahela	Crane boat (nonpropelling).	211	120	0	28	0	3	6	1914	do
It, M. R	Derrick boat (nonpropelling).	47	50	0	22	0	4	2	1899	Monongahela, Pa
No. 1, M. R	do	76	70	0	26	0	3	8	1916	United States Boatyard, Lock No. 4, Pa.
No. 2, M. R	do	80	70	6	26	6	4	0	1902	do
No. 3, M. R	do	96	70	7	26	7	4	0	1905	do
No. 4, M. R	do	89	70	0	32	0	3	8	1916	do
No. 5, M. R	do	89	70	0	32	0	3	8	1915	do
No. 1, O. R	do	90	71	0	30	7	4	0	1910	do
No. 1, M. R	Scraper boat (derrick) (nonpropelling).	64	50	2	28	4	4	6	1910	do
No. 1, M. R	Dump scow, 4 pockets, 90 cubic yards.		70	2	20	10	6	9	1902	Cincinnati, Ohio.
No. 2, M. R	do		70	2	20	10	6	9	1902	do
No. 5, M. R	do		70	2	20	10	6	9	1907	United States Boatyard, Lock No. 4, Pa.
No. 6, M. R	do		70	2	20	10	6	9	1907	do
No. 1, M. R	Pile driver boat (nonpropelling).	68	50	0	26	6	4	0	1904	do
No. 2, M. R	do	66	50	0	26	4	4	7	1906	do
No. 1, M. R	Quarterboat (nonpropelling).	44	85	0	22	0	3	6	1902	do
No. 1, A. R[4]	Maneuver boat (nonpropelling).	68	60	0	20	0	3	0	1902	Pittsburgh, Pa
No. 1, O. R[5]	do	61	60	0	22	0	4	0	1906	United States Boatyard, Lock No. 4, Pa.
No. 2, O. R	do	77	60	0	22	0	3	8		
No. 3, O. R[6]	do	75	60	0	22	0	4	0	1906	Glenosborne, Pa

[1] Formerly No. 116011.

[2] Formerly Gen. Theodore Schwan.

[3] Dismantled.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

PITTSBURGH, PA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	$13,500.00	$8,000.00	Fair...	$266.07	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
......	....	Steel..	51,800.00	19,000.00	Good..	712.47	Monongahela River, W. Va., Locks 3, 6, etc.
......	....	Wood.	17,370.00	9,000.00	...do..	72.19	Monongahela River, W. Va., Locks 10–15, and operating and care of canals and other works of navigation, indefinite, Monongahela River.
......	....	...do..	6,000.00	1,000.00	Fair...	408.76	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
......	....	...do..	4,000.00	3,800.00	Good..	50.00	Operating and acre of canals and other works of navigation, indefinite, Ohio River.
......	....	...do..	21,502.00	18,000.00	...do..	247.28	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
......	....	...do..	2,800.00	10.00	Bad...	([illegible])	Do.
......	....	...do..	6,423.00	6,000.00	Good..	51.90	Do.
......	....	...do..	3,300.00	1,800.00	Fair...	105.00	Do.
......	....	...do..	3,500.00	1,000.00	...do..	265.30	Do.
......	....	...do..	7,561.00	7,200.00	Good..	496.88	Do.
......	....	...do..	8,184.00	7,000.00	...do..	350.60	Do.
......	....	...do..	6,785.00	4,300.00	Fair...	337.50	Operating and care of canals and other works of navigation, indefinite, Ohio River.
......	....	...do..	3,675.00	2,000.00	...do..	374.90	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
1902	Pittsburgh, Pa..	...do..	3,600.00	600.00	...do..	....	Monongahela River, W. Va., Locks 3, 6, etc.
1902	....do..........	...do..	3,600.00	600.00	...do..	....	Do.
......	....	...do..	3,500.00	600.00	Bad...	....	Operating and care of canals and other works of Navigation, indefinite, Monongahela River.
......	....	...do..	3,500.00	600.00	...do..	....	Do.
......	....	...do..	3,500.00	1,000.00	...do..	9.30	Monongahela River, Pa., Lock 2.
......	....	...do..	3,750.00	400.00	...do..	....	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
......	....	..do..	3,150.00	700.00	...do..	7.12	Do.
......	....	...do..	4,000.00	3,300.00	Good..	52.00	Dam at Herrs Island, Allegheny River, near Pittsburgh, Pa.
......	....	...do..	5,600.00	1,800.00	Bad...	40.00	Ohio River below Pittsburgh, Pa., Dam 2.
1914	Pittsburgh, Pa..	Steel..	8,820.00	8,000.00	Good..	69.00	Operating and care of canals and other works of navigation, indefinite, Ohio River.
......	....	Wood.	6,000.00	5,000.00	...do..	20.00	Ohio River below Pittsburgh, Pa., Dam 3.

[4] New hull, 1914

[5] Formerly No. 2.

[6] New hull, 1915.

TABLE 3.—*Statement of floating plant owned by the United States and*

PITTSBURGH, PA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 4, O. R[1]	Maneuore boat (nonpropelling.	68	60	0	22	0	3	8	1906	Legionville, Pa
No. 5, O. R[1]	do	64	60	0	22	0	3	8	1906	Merrill, Pa
No. 6, O. R[2]	do	56	60	0	20	0	3	8	1904	United States Boatyard, Lock No. 4, Pa.
No. 7, O. R	do	77	60	0	22	0	3	8		
No. 8, O. R	do	69	60	0	22	0	3	8		
No. 9, O. R	do	77	60	0	22	0	3	8		
No. 10, O. R	do	81	60	0	22	0	3	8		
No. 1[3]	Flat	155	90	0	16	0	6	0		
No. 5	do		40	0	14	0	2	6	1916	United States Boatyard, Lock No 4, Pa.
No. 6	do	156	90	6	16	0	6	0		
No. 7	do	156	90	6	16	0	6	0		
No. 8	do	175	90	0	18	0	6	0	1902	United States Boatyard, Lock No. 4, Pa.
No. 9	do	175	90	0	18	0	6	0	1902	do
No. 10	do	175	90	0	18	0	6	0	1902	do
No. 11	do	175	90	0	18	0	6	0	1902	do
No. 12	do	217	100	0	20	0	6	0	1905	do
No. 13[4]	do	260	100	0	24	0	6	0	1905	do
No. 14	do		41	0	14	0	2	6	1916	do
No. 15	do	217	100	0	20	0	6	0	1905	do
No. 16	do	217	100	0	20	0	6	0	1905	do
No. 17[4]	do	260	100	0	24	0	6	0	1905	do
No. 19	do		48	0	12	0	2	2	1915	do
No. 20	do	175	90	0	18	0	6	0	1908	do
No. 21[5]	do		38	0	11	0	2	1	1897	do
No. 22	do		38	0	11	0	2	0	1904	do
No. 23	do		38	0	11	0	2	0	1904	do
No. 24	do		38	0	11	0	2	0	1904	do
No. 25	do		38	0	11	0	2	0	1904	do
No. 26	do		38	0	11	0	2	0	1904	do
No. 27	do		38	0	11	0	2	0	1904	do
No. 28	do		24	0	9	0	1	7	1908	do
No. 29	do		42	8	12	0	2	4	1908	do
No. 30	do		38	0	11	0	2	0	1909	do
No. 31	do		48	0	11	0	2	0	1909	do
No. 32	do		48	0	11	0	2	0	1909	do
No. 33	do		36	0	12	0	2	0	1909	do
No. 34	do		48	0	12	0	2	0	1910	do
No. 35	do		42	0	10	0	2	0	1911	do
No. 36	do	217	100	0	20	0	6	0	1912	do
No. 37[6]	do	217	100	0	20	0	6	0	1912	do
No. 39	do	260	100	0	24	0	6	0	1916	do
No. 40	do	260	100	0	24	0	6	0	1916	do
No. 41	do	260	100	0	24	0	6	0	1916	do
No. 42	do	260	100	0	24	0	6	0	1916	do
No. 44	do		30	0	10	0	2	0	1916	do
No. 45	do		30	0	10	0	2	0	1916	do
No. 46	do		30	0	10	0	2	0	1916	do
No. 47	do		30	0	10	0	2	0	1916	do
No. 48	do		30	0	10	0	2	0	1916	do
No. 49	do		30	0	10	0	2	0	1916	do

[1] New hull, 1915.

[2] New hull, 1913.

[3] Second hand; rebuilt in 1908 by United States, Lock 4, Pa.

[4] Temporarily equipped with concrete mixer outfit.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

PITTSBURGH, PA.—Continued

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$6,000.00	$5,000.00	Good..	$75.71	Ohio River below Pittsburgh, Pa., Dam 4.
		...do..	4,250.00	3,800.00	Fair...	130.00	Ohio River below Pittsburgh, Pa., Dam 5.
		...do..	4,600.00	4,100.00	Good..	369.24	Ohio River below Pittsburgh, Pa., Dam 6.
1914	Pittsburgh, Pa..	Steel..	8,820.00	7,900.00	...do..	519.50	Ohio River below Pittsburgh, Pa., Dam 7.
1910	.....do..........	Wood.	5,101.00	2,500.00	Fair...	256.68	Ohio River below Pittsburgh, Pa., Dam 8.
1914	.....do..........	Steel..	8,820.00	7,950.00	Good..	9.20	Ohio River below Pittsburgh, Pa., Dam 9.
1916	.....do..........	...do..	6,702.00	6,500.00	...do..	500.58	Ohio River below Pittsburgh, Pa., Dam 10.
1899	.....do..........	Wood.	400.00	600.00	Fair...	331.30	Operating and care of canals and other works of navigation, indefinite, Monongahela River.
		...do..	393.00	300.00	Good..		Do.
1899	Roscoe, Pa.......	...do..	750.00	450.00	...do..		Do.
1899	.....do..........	...do..	750.00	360.00	Fair...		Do.
		...do..	1,300.00	700.00	Good..	381.67	Do.
		...do..	1,300.00	90.00	Bad...		Do.
		...do..	1,300.00	50.00	...do..		Do.
		...do..	1,300.00	450.00	...do..		Do.
		...do..	1,600.00	360.00	...do..		Do.
		...do..	1,700.00	360.00	...do..		Do.
		...do..	344.00	310.00	Good..		Do.
		...do..	1,600.00	1,000.00	Fair...	698.98	Do.
		...do..	1,600.00	350.00	...do..		Do.
		...do..	1,700.00	450.00	...do..		Do.
		...do..	301.00	225.00	...do..		Do.
		...do..	1,300.00	750.00	...do..	25.37	Do.
		...do..	200.00	10.00	Bad...		Do.
		...do..	175.00	10.00	...do..		Do.
		...do..	175.00	5.00	...do..		Do.
		...do..	175.00	10.00	...do..		Do.
		...do..	175.00	10.00	...do..		Do.
		...do..	175.00	10.00	...do..		Do.
		...do..	175.00	5.00	...do..		Do.
		...do..	120.00	40.00	Good..		Do.
		...do..	210.00	120.00	Fair...		Do.
		...do..	187.00	70.00	Bad...		Do.
		...do..	204.00	90.00	Fair...		Do.
		...do..	196.00	75.00	...do..		Do.
		...do..	184.00	50.00	...do..		Do.
		...do..	213.00	60.00	...do..		Do.
		...do..	222.00	50.00	Bad...		Harbor at Pittsburgh, Pa.
		...do..	2,015.00	1,000.00	Fair...		Operating and care of canals and other works of navigation, indefinite, Monongahela River.
		...do..	2,015.00	1,000.00	...do..		Do.
		...do..	2,854.00	2,500.00	Good..	27.18	Do.
		...do..	2,854.00	2,500.00	...do..		Do.
		...do..	2,854.00	2,500.00	...do..		Do.
		...do..	2,854.00	2,500.00	...do..		Do.
		...do..	211.00	190.00	...do..		Do.
		...do..	211.00	190.00	...do..		Do.
		...do..	211.00	190.00	...do..		Do.
		...do..	211.00	190.00	...do..		Do.
		...do..	211.00	190.00	...do..		Do.
		...do..	211.00	190.00	...do..		Do.

---

[5] Shortened 9 feet in 1915.

[6] Temporarily equipped as a pump boat.

TABLE 3.—*Statement of floating plant owned by the United States and*

PITTSBURGH, PA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 101	Flat		35	0	12	0	1	10	1910	United States Boatyard, Lock No. 4, Pa.
No. 102	do		48	0	12	0	2	7	1902	Merrill, Pa
No. 103	do		40	0	12	0	2	6	1914	United States Boatyard, Lock No. 4, Pa.
No. 104	do		40	0	12	0	2	6	1914	do
No. 105	do		48	0	11	0	2	6	1905	do
No. 106	do		40	0	12	0	2	0	1915	do
No. 107	do	217	100	0	20	0	6	0	1905	do
No. 108	do		40	0	12	0	2	6	1916	do
No. 109	do		35	0	12	0	2	0	1911	do
No. 110	do		40	0	12	0	2	6	1911	do
No. 111	do		45	0	12	0	2	6	1916	do
No. 114	do		48	0	12	0	2	6	1908	do
No. 115	do		48	0	11	0	2	6	1908	do
No. 201	do		36	0	14	0	2	0	1911	do
No. 202	do		28	0	10	0	2	6	1916	do
No. 203	do		41	0	12	0	2	6		
No. 205	do		28	0	10	0	2	6	1916	do

PORTLAND, ME.

Norka	Launch, motor	22	62	0	14	0	6	1	1905	New York, N. Y

PORTLAND, OREG., FIRST DISTRICT.

Michie, Col. P. S	Seagoing dredge	1,526.00	242	0	43	0	20	0	1913	Seattle, Wash
Oregon	Hydraulic pipe line	645.00	120	0	36	0	11	0	1908	Portland, Oreg
Celilo	do	64.00	76	0	22	0	4	4	1916	Big Eddy, Oreg
Cascade [1]	Bucket dredge	90.00	70	0	30	0	4	0	1906	Portland, Oreg
Umatilla	Self-propelled dredge	300.00	159	9	34	4	5	1	1908	Celilo, Oreg
Asotin	do	200.00	140	0	28	0	5	0	1913	do
Coyote	Gasoline launch	2.00	28	0	5	6	3	0	1911	Portland, Oreg
Jennie	do	5.00	30	0	8	0	3	3	1907	do
Murrelet	do	2.50	24	0	6	5	2	6	1913	Astoria, Oreg
Nehalem [2]	do	5.00	30	0	8	9	3	0		Not known
Ocla	do	2.00	30	0	5	0	3	0	1906	Portland, Oreg
Palouse [2]	do	2.00	27	9	41	8	2	9	1907	do

[1] New hull in 1915.

[2] Condition excellent, until Dec. 18, 1917, when badly damaged by storm.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

PITTSBURGH, PA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$166.00		Bad		Operating and care of canals and other works of navigation, indefinite, Ohio River.
		do	150.00	$45.00	Fair		Ohio River below Pittsburgh, Pa., Dam 6.
		do	262.00	220.00	Good		Operating and care of canals and other works of navigation, indefinite, Ohio River.
		do	262.00	220.00	do		Do.
		do	204.00	10.00	Bad		Ohio River below Pittsburgh, Pa., Dam 5.
		do	307.00	260.00	Fair		Ohio River below Pittsburgh, Pa., Dam 10.
		do	1,600.00	360.00	do		Ohio River below Pittsburgh, Pa., Dam 3.
		do	300.00	270.00	Good		Operating and care of canals and other works of navigation, indefinite, Ohio River.
		do	160.00	45.00	Fair		Do.
		do	224.00	45.00	do		Do.
		do	385.00	350.00	Good		Do.
		do	245.00	65.00	Fair		Do.
		do	245.00	60.00	Bad		Do.
		do	197.00	85.00	Good		Operating and care of canals and other works of navigation, indefinite, Allegheny River.
		do	200.00	180.00	do		Do.
1907	Coraopolis, Pa	do	215.00		Bad		Do.
		do	196.00	175.00	Good		Do.

PORTLAND, ME.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
1905	New York, N. Y	Wood.	$12,500.00	$3,500.00	Hull fair, engines poor.	$335.68	River and harbor improvements.

PORTLAND, OREG., FIRST DISTRICT.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
1913	Seattle, Wash	Steel	$378,198.63	$365,000.00	Excellent.	$5,269.22	Coos Bay, Oreg.
1908	Portland, Oreg	Wood.	98,502.58	75,000.00	Fair	275.57	Various harbors, Oregon and Washington.
		do	5,000.00	5,000.00	Excellent.	720.44	Operating and care, Dalles-Celilo Canal.
		do	6,056.00	5,000.00	Good	525.77	Operating and care, entrance Cascade Locks.
1908	Celilo, Oreg	do	55,245.00	25,000.00	Fair	2,071.91	Upper Columbia and Snake Rivers.
		do	30,815.00	22,000.00	Excellent.	156.73	Do.
1911	Portland, Oreg	do	1,450.00	950.00	Good	624.72	Do.
1907	do	do	1,550.00	650.00	Fair	10.00	Tillamook Bay and Bar, Oreg.
1913	Astoria, Oreg	do	880.00	640.00	Excellent.	83.93	Coos Bay, Oreg. (tender dredge Michie).
1916	Nehalem, Oreg	do	900.00	750.00	Unserviceable.	18.15	Nehalem Bay, Oreg.
1908	Portland, Oreg	do	1,500.00	1,200.00	Good	587.46	Snake River, Oreg.
		do	2,150.00	1,000.00	do	229.25	Columbia River, above Celilo (drill boat tender).

---

[3] New hull, 1914.

TABLE 3.—*Statement of floating plant owned by the United States and*

PORTLAND, OREG., FIRST DISTRICT—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Tumwater	Gasoline launch	3.00	32 5	7 2	3 0	1917	Portland, Oreg
No. 1	Derrick boat	51.00	65 0	28 5	3 10	1890	Coos Bay, Oreg
No. 2	do	84.00	70 0	30 0	4 0	1910	North Bend, Oreg
No. 1	200-ton dredge scow	60.00	62 0	28 0	5 6	1890	Coquille River, Oreg
No. 2	84-ton dredge scow	84.00	70 0	30 0	3 8	1900	Tillamook Bay, Oreg
No. 1	57-ton wood scow	50.00	60 0	24 0	4 0	1900	Portland, Oreg
No. 2	10-ton wood scow	18.00	38 0	12 0	3 0	1905	Tillamook, Oreg
No. 1	7-ton flatboat	10.00	30 0	10 0	2 9	1903	do
"A"	Coal barge	250.00	90 0	30 0	7 0	1909	Kennewick, Wash
No. 1	Drill boat	50.00	65 0	20 0	3 8	1907	Riparia, Wash
No. 2	do	50.00	65 0	20 0	3 8	1907	do
No. 3	do	50.00	65 0	20 0	3 8	1907	do
No. 11	Stone barge	270.00	90 0	32 0	7 0	1915	Portland, Oreg
No. 12	do	270.00	90 0	32 0	7 0	1915	do
No. 13	Fuel barge	60.00	61 0	24 0	5 0	1915	do
No. 14	Water barge	45.00	50 0	20 0	3 6	1915	do
No. 15	Fuel barge	25.00	40 0	14 0	3 2	1917	Big Eddy, Oreg

PORTLAND, OREG., SECOND DISTRICT.

Name or number.	Type.	Displacement in long tons.	Length.	Beam.	Depth.	When.	Where.
Chinook[1]	Seagoing hopper dredge	7,400.00	460 0	49 0	34 0	[2] 1892	Belfast, Ireland
Clatsop	do	1,360.00	180 0	38 0	23 0	1908	Newport News, Va
Multnomah	Hydraulic pipe-line dredge.	1,135.00	269 4	39 0	9 6	1913	Portland, Oreg
Wahkiakum	do	1,135.00	269 4	39 0	9 6	1913	do
Monticello	Combined hydraulic pipe-line and bucket dredge.	195.00	103 3	34 6	5 10	1915	(3)
Champoeg	Dipper dredge	165.00	80 0	30 0	5 0	1904	Portland, Oreg
Mathloma	Snag boat	177.00	160 0	34 6	5 6	[4] 1896	do
No. 1	Derrick boat (barge)	42.00	51 0	22 6	2 10	1913	do
No. 2	do	42.00	51 0	22 6	2 10	1913	do
No. 3	do	42.00	51 0	22 6	2 10	1913	do
No. 4	do	42.00	51 0	22 6	2 10	1913	do
No. 5	do	112.00	90 0	30 0	6 4	1015	do
No. 2	Pile driver	82.00	70 0	24 0	4 0	1912	do
No. 3	do	52.00	66 0	23 0	3 6	1917	do
Adams, H. M	Tugboat, screw, steam	95.00	78 4	18 9	7 6	1913	Astoria, Oreg

---

[1] Formerly U. S. transport Grant.
[2] Remodeled at San Francisco, Cal., in 1903: at Portland, Oreg., in 1910, and again in 1914.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

PORTLAND, OREG., FIRST DISTRICT—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$1,850.00	$1,850.00	Excellent.	$12.50	Operating and care, Dalles-Celilo Canal.
		do	3,785.00	300.00	Poor		Out of commission during year.
1910	NorthBend, Oreg	do	5,574.37	2,700.00	Good	42.50	Coos River, Oreg.
		do	3,000.00	25.00	Unserviceable.		Coquille River, Oreg.
1900	Tillamook Bay, Oreg.	do	2,700.00	2,250.00	Good	850.00	Tillamook Bay and Bar, Oreg.
1900	Portland, Oreg.	do	750.00	500.00	do	350.00	Do.
1906	Tillamook, Oreg	do	250.00	100.00	Fair		Do.
1903	do	do	250.00	350.00	Excellent.	300.00	Do.
1913	Kennewick, Wash.	do	1,500.00	500.00	Poor	50.00	Upper Columbia and Snake Rivers.
1907	Riparia, Wash.	do	4,682.00	1,000.00	Fair		Do.
1907	do	do	4,682.00	1,000.00	do	185.24	Do.
1907	do	do	4,682.00	1,000.00	do		Do.
1915	Portland, Oreg.	do	3,872.50	3,450.00	Good		Coquille River, Oreg.
1915	do	do	3,872.50	3,400.00	do		Do.
		do	1,850.00	1,750.00	do		Tillamook Bay, Oreg. (for dredge Oregon).
		do	990.00	950.00	do		Do.
		do	717.54	717.00	Excellent.		Operating and care, Cascade Locks, Oreg.

PORTLAND, OREG., SECOND DISTRICT.

		Steel	Unknown.	$374,400.00	Good	$18,686.24	Improving mouth of Columbia River, Oreg. and Wash.
		do	$304,385.00	175,000.00	do	5,204.15	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
		do	174,236.50	160,796.50	do	3,135.04	Do.
		do	174,236.50	160,796.50	do	3,172.72	Do.
		Wood.	27,830.00	25,420.00	do	106.85	Improving Cowlitz, Lewis, and Clatskanie Rivers, Wash. and Oreg.
		do	19,200.00	3,000.00	Poor		Improving Willamette and Yamhill Rivers, Oreg.
		do	19,560.00	10,000.00	Fair	34.22	Do.
		do	2,706.00	1,519.50	Good		Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
		do	2,706.00	1,519.50	do		Do.
		do	2,706.00	1,519.50	do		Do.
		do	2,706.00	1,519.50	do		Do.
		do	8,400.00	7,016.00	do	195.19	Improving Willamette River, Oreg., for Willamette Falls.
		do	8,750.00	5,483.00	Fair	569.02	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
		do	3,858.05	3,472.24	Good		Improving Willamette and Yamhill Rivers, Oreg.
		do	16,465.83	12,685.83	do	722.08	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.

[3] Hull and house, St. Helens, Oreg.; machinery, Portland, Oreg.

[4] Hull rebuilt at Portland, Oreg., in 1906 and again in 1915.

TABLE 3.—*Statement of floating plant owned by the United States and*

PORTLAND, OREG., SECOND DISTRICT—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Arago	Tugboat, screw, steam	90.00	89 6	18 0	9 0	1904	Portland, Oreg.
Mendell, G. H.	do	150.00	101 0	21 2	10 0	(2)	do
Post, J. C.	do	95.00	78 4	18 9	7 6	1913	Astoria, Oreg.
Woodland	Towboat, paddle (steam)	75.00	97 0	24 0	4 6	1915	Portland, Oreg.
Eureka	Gasoline launch (screw)	3.00	25 0	8 6	3 4	1908	Wilmington, Del.
Papoose	do	6.00	30 3	8 0	4 0	1899	Morris Heights, N.Y.
Salem	do	6.50	35 0	9 0	3 6	1910	Portland, Oreg.
Vigilant	do	22.00	61 3	12 0	7 6	1908	Eagle Harbor, Wash.
No. 1	Quarter boat	120.00	90 0	26 0	4 0	[3] 1902	Portland, Oreg.
No. 2	do	26.00	56 0	20 0	3 6	1915	do
No. 1	400-ton fuel barge (scow)	118.00	124 0	32 6	5 10	1913	do
No. 2	do	118.00	124 0	32 6	5 10	1913	do
No. 3	do	118.00	121 0	32 6	5 10	1913	do
No. 4	do	118.00	124 0	32 6	5 10	1913	do
No. 5	do	118.00	124 0	32 6	5 10	1913	do
No. 6	do	118.00	124 0	32 6	5 10	1913	do
No. 7	do	118.00	124 0	32 6	5 10	1915	do
No. 8	do	118.00	124 0	32 6	5 10	1915	do
No. 9	85-ton fuel barge (scow)	40.00	68 6	24 6	4 0	1916	do
A	500-ton model barge	350.00	120 0	32 0	8 0	1902	do
B	do	350.00	120 0	32 0	8 0	1902	do
No. 3	30-ton scow barge	20.00	48 0	18 0	3 6	1915	do
No. 4	do	20.00	48 0	18 0	3 6	1915	do
No. 5	do	20.00	48 0	18 0	3 6	1915	do
No. 6	do	20.00	48 0	18 0	3 6	1915	do
No. 7	200-ton scow barge	100.00	90 0	30 0	6 4	1915	do
No. 8	30-ton scow barge	20.00	48 0	18 0	3 6	1917	do
No. 9 [4]	200-ton scow barge	100.00	90 0	30 0	6 4	1915	do
Nos. 1 to 100	Pipe-line pontoons	5.50	26 8	12 4	2 5	1913	do
Nos. 101 to 160	do	5.50	26 8	12 4	2 5	1913	do
Nos. 161 to 180	do	1.00	10 0	6 0	2 0	1915	do
Nos. 12 to 17	Rowboats	(5)	......	(5)	......	(5)	(6)

---

[1] Includes outfit.

[2] Engines built in 1889, boiler in 1904, hull and house in 1912.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

PORTLAND, OREG., SECOND DISTRICT—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	[1] $24,490.00	$3,500.00	Poor..	$320.10	Improving mouth of Columbia River, Oreg. and Wash., and improving Columbia and Lower Willamette Rivers below Portland, Oreg.
		...do...	34,750.00	23,300.00	Good..	341.13	Do.
		...do...	16,465.83	12,685.83	...do...	327.60	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
		...do...	16,978.00	15,270.00	...do...	8.55	Improving Cowlitz, Lewis, and Clatskanie Rivers, Wash. and Oreg.
		...do...	Unknown.	125.00	Poor..		Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
		...do...	Unknown.	800.00	Fair...	337.88	Improving mouth of Columbia River, Oreg. and Wash.
		...do...	2,200.00	800.00	Poor..	140.34	Improving Willamette and Yamhill Rivers, Oreg.
		...do...	6,900.00	2,800.00	...do...	228.93	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
		...do..	3,050.00	2,618.00	Good..		Do.
		...do...	727.86	631.86	...do...		Do.
		...do...	3,960.00	2,574.00	..do...		Do.
		...do...	3,960.00	2,574.00	...do...		Do.
		...do...	3,960.00	2,574.00	...do...		Do.
		...do...	3,960.00	2,574.00	...do...		Do.
		...do...	3,960.00	2,574.00	...do...		Do.
		...do...	3,960.00	2,574.00	...do...		Do.
		...do...	4,487.50	3,587.50	...do...		Do.
		...do...	4,487.50	3,587.50	...do...		Do.
		...do...	2,126.00	1,984.81	...do...		Do.
		...do. .	6,950.00	1,500.00	Poor..		Improving mouth of Columbia River, Oreg. and Wash.
		...do...	6,950.00	1,500.00	...do...		Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
		...do...	477.63	347.32	Good..		Do.
		...do...	477.63	347.32	...do...		Do.
		...do...	477.63	347.32	...do...		Do.
		...do...	477.63	347.32	...do...		Do.
		...do...	3,600.00	2,700.00	...do...		Improving Willamette River, Oreg., for Willamette Falls.
		...do...	650.00	550.00	...do...		Improving mouth of Columbia River, Oreg. and Wash.
		...do...	3,600.00	2,700.00	...do...		Improving Willamette River, Oreg., for Willamette Falls.
		...do...	[5] 177.50	[5] 98.30	...do...		Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
		...do...	[5] 170.00	[5] 98.30	...do...		Do.
		...do...	[5] 50.00	[5] 35.00	...do...		Improving Cowlitz, Lewis and Clatskanie Rivers, Wash. and Oreg.
		(6)	(6)	(6)	...do...		(6)

---

[3] Hull rebuilt at Portland, Oreg., in 1915.

[4] Formerly hull of Concrete Mixer No. 1.

[5] Each.

[6] Various.

TABLE 3.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Apo	Hydraulic pipe-line dredge.	294.00	132	0	28	5	5	0	1912	Keokuk, Iowa
Etna	do	266.00	130	0	28	0	5	0	1909	do
Geyser	do	141.00	100	0	24	0	4	5	1912	Milan, Ill
Hecla	do	217.00	120	0	26	0	5	0	1901	Fountain City, Wis
Mayon	do	309.00	130	6	26	0	5	5	1912	Keokuk, Iowa
Pelee	do	250.00	119	0	30	0	5	0	1909	Stillwater, Minn
Taal	do	299.00	130	0	28	0	5	0	1912	Keokuk, Iowa
Vesuvius	do	244.00	120	0	30	0	5	0	1909	Fountain City, Wis
236	Suction ponton		56	0	15	6	2	6	1909	Stillwater, Minn
261	do		56	0	16	0	3	0	1909	Fountain City Wis
318	do		64	0	16	0	2	6	1909	Keokuk, Iowa
352	do		64	0	16	0	3	6	1910	do
353	do		64	0	16	0	3	6	1910	do
354	do		61	0	16	0	3	6	1910	do
Ajax	Dipper dredge	115.00	70	0	26	0	6	0	1876	Quincy, Ill
Apache[1]	do									
Davenport	do	348.00	110	0	40	0	6	0	1914	Rock Island, Ill
Keokuk	do	348.00	110	0	40	0	6	0	1914	do
St. Paul	do	348.00	110	0	40	0	6	0	1914	do
Tipton, David[2]	Snag boat	235.00	165	0	34	0	5	0	1900	Jeffersonville, Ind
Ada	Towboat	30.00	76	0	11	0	3	0	1889	Keokuk, Iowa
Alert	do	135.00	130	0	19	6	3	10	1874	Stillwater, Minn
Coal Bluff	do	175.00	148	0	35	0	4	0	1878	Ohio River
Elinor	do	213.00	146	0	25	0	4	0	1905	Jeffersonville, Ind
Ellen	do	200.00	144	0	26	0	4	5	1907	La Crosse, Wis
Elsie	do	30.00	75	0	13	0	3	0	1899	Jeffersonville, Ind
Emily	do	30.00	78	6	12	0	3	0	1889	Keokuk, Iowa
Fury	do	120.00	128	6	22	0	3	10	1881	Dubuque, Iowa
Grace	do	38.00	92	6	17	0	3	3	1904	Keokuk, Iowa
Le Claire	do	285.00	125	4	31	0	4	0	1915	Grafton, Ill
Louise	do	30.00	78	0	12	0	3	3	1884	Keokuk, Iowa
Lucia	do	35.00	76	0	12	8	3	0	1885	do
Mac	do	35.00	85	0	16	0	3	3	1891	Rock Island, Ill
Marion	do	50.00	93	0	18	0	3	0	1895	Keokuk, Iowa
Minneapolis	do	285.00	125	4	31	0	4	0	1915	Grafton, Ill
Muscatine	do	285.00	125	4	31	0	4	0	1915	do
Nauvoo	do	285.00	125	4	31	0	4	0	1915	do
Ruth	do	35.00	80	0	18	9	3	6	1895	Keokuk Iowa
Chippewa	Launch (gasoline, screw)		35	0	6	0	2	6	1913	St. Paul, Minn
Galena	do		35	0	6	0	2	6	1913	do
Hiawatha	do		35	0	6	0	2	6	1913	do
Long, J. C	do	12.00	45	0	8	5	3	5	1900	La Crosse, Wis
Leona	Launch (gasoline, paddle).	10.00	40	0	12	0	3	0	1907	Blossomburg, Ill

[1] Condemned.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ROCK ISLAND, ILL.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood, steel, and concrete.	$28,703.00	$14,063.68	Good..	$1,218.87	Mississippi River, Missouri River to Minneapolis.
......	....	..do...	25,328.00	13,707.03	...do...	1,287.94	Do.
......	....	Wood and steel.	19,552.00	14,132.98	...do...	1,381.90	Do.
......	....	Wood.	27,084.00	9,299.51	...do...	4,290.16	Do.
......	....	Wood, steel, and conctere.	29,154.00	20,237.22	...do...	447.19	Do.
......	....	Wood.	31,956.00	13,602.08	...do...	1,889.58	Do.
......	....	Wood, steel, and concrete.	28,476.93	13,689.26	...do...	727.75	Do.
......	....	Wood.	29,720.78	8,992.89	...do...	997.54	Do.
......	....	...do...	982.00	674.24	...do...	65.63	Do.
......	....	...do...	753.00	273.53	...do...	40.77	Do.
......	....	...do...	747.00	537.75	...do...	115.45	Do.
......	....	...do...	781.00	455.95	...do...	168,00	Do.
......	....	...do...	784.00	509.63	...do...	80.42	Do.
......	....	...do...	702.00	242.17	...do...	....	Do.
1876	Keokuk, Iowa...	...do...	11,300.00	2,059.06	Fair...	....	Des Moines Rapids Canal.
......	....	Steel..	56,663.00	27,430.46	Good..	2,574.29	Mississippi River, Missouri River to Minneapolis.
......	....	...do...	56,454.00	25,760.22	...do...	908.42	Do.
......	....	...do...	56,130.00	25,941.70	...do...	1,377.74	Do.
1900	Jeffersonville, Ind.	Wood.	32,000.00	9,128.57	Fair...	2,422.20	Snag boats and dredge boats on Upper Missispipi River and tributaries.
......	....	...do...	4,000.00	1,953.30	Poor..	201.01	Mississippi River, Missouri River to Minneapolis.
1881	Stillwater, Minn.	...do...	6,000.00	5,487.70	...do...	1,012.16	Do.
1881	Ohio River......	...do...	8,000.00	9,657.17	Fair...	1,438.04	Do.
1905	Jeffersonville, Ind.	...do...	17,589.00	7,272.67	Good..	3,825.37	Do.
1911	La Crosse, Wis..	...do...	12,000.00	6,945.00	Fair...	922.11	Do.
1889	Jeffersonville, Ind.	Steel..	5,110.00	1,587.23	Good..	318.44	Do.
......	....	Wood.	4,034.00	1,715.52	...do...	383.05	Do.
1881	Dubuque, Iowa.	...do...	11,976.00	6,530.02	Fair...	1,445.13	Do.
......	....	...do...	8,228.00	3,112.10	...do...	1,026.02	Do.
......	....	Steel..	44,238.00	30,462.91	Good..	1,505.66	Do.
......	....	...do...	3,538.00	1,428.53	...do...	295.28	Do.
......	....	Wood.	4,000.00	2,270.22	...do...	469.51	Do.
1893	Rock Island, Ill.	...do...	3,153.00	2,936.53	Fair...	200.65	Do.
......	....	...do...	6,500.00	3,322.71	...do...	418.17	Illinois and Mississippi Canal.
......	....	Steel..	44,675.00	31,097.81	Good.	2,396.52	Mississippi River, Missouri River to Minneapolis.
......	....	...do...	43,789.00	28,990.54	...do...	1,120.61	Do.
......	....	...do...	42,868.00	29,022.21	...do...	922.06	Do.
......	....	Wood.	6,426.00	5,300.91	...do...	1,199.67	Do.
1913	St. Paul, Minn..	...do...	1,724.00	828.66	...do...	142.19	Do.
1913	.....do..........	...do...	1,724.00	1,167.19	Fair...	351.77	Do.
1913	.....do..........	...do...	1,557.00	670.18	Good.	168.42	Do.
1903	Rock Island, Ill.	...do...	1,700.00	1,150.70	Fair...	5.28	Illinois and Mississippi Canal.
1910	Coal Valley, Ill..	...do...	1,000.00	1,092.74	...do...	240.39	Do.

---

* Formerly Col. A. Mackenzie.

TABLE 3.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Minneiska	Launch (gasoline, screw)		35 0	6 0	2 6	1913	St. Paul, Minn
Minnehaha	do		35 0	6 0	2 6	1912	do
Myra [1]	do	10.00	40 0	7 4	3 6	1902	La Crosse, Wis
Quincy	do		35 0	6 0	2 6	1912	St. Paul, Minn
Scorpion	do		28 0	4 6	2 4	1911	Keokuk, Iowa
Sny	do	18.9	52 6	13 0	4 0	1916	Milan, Ill
Trimbelle	do		35 0	6 0	2 6	1913	St. Paul, Minn
Vamos [2]	do	5.00	31 0	7 0	2 0	1903	Red Wing, Minn
Viper	do		28 0	4 6	2 6	1909	Keokuk, Iowa
Waumandee	do		30 0	5 8	2 6	1910	Tonka Bay, Minn
Zumbro	do		35 0	6 0	2 6	1913	St. Paul, Minn
Alberita	Motor-skiff		26 0	5 3	1 3	1910	Keokuk, Iowa
Alma	do		28 0	5 1	1 8	1917	Milan, Ill
Bass	do		26 0	5 3	1 3	1910	Keokuk, Iowa
Cobra	do		26 0	5 3	1 3	1909	do
Comet	do		26 0	5 3	1 3	1911	do
Cordova	do		26 0	5 0	1 6	1917	Milan, Ill
Dahlia	do		26 0	5 3	1 3	1912	Keokuk, Iowa
Daisy	do		26 0	5 3	1 3	1912	do
Dakota	do		28 0	5 2	1 3	1913	St. Paul, Minn
Davy	do		26 0	4 0	1 3	1909	Fountain City, Wis
Folly	do		26 0	5 3	1 3	1909	Keokuk, Iowa
Gar [3]	do						
Grey Cloud	do		28 0	5 2	1 3	1913	St. Paul, Minn
Hamilton	do		28 0	5 6	1 10	1915	Milan, Ill
Hally	do		26 0	5 3	1 3	1909	Keokuk, Iowa
Hornet [4]	do						
Jolly	do		26 0	5 3	1 3	1909	Keokuk, Iowa
Lark	do		26 0	5 3	1 3	1907	do
Molly	do		26 0	5 3	1 3	1909	do
Otter	do		26 0	5 3	1 3	1913	do
Pansy	do		26 0	5 3	1 3	1912	do
Perch	do		26 0	5 3	1 3	1911	do
Peony	do		26 0	5 3	1 3	1912	do
Pepin	do		28 0	5 2	1 3	1913	St. Paul, Minn
Pink	do		26 0	5 3	1 3	1912	Keokuk, Iowa
Rock Island Rapids [4]	do						
Rose	do		28 0	6 0	1 8	1912	Keokuk, Iowa
Shad	do		26 0	5 3	1 3	1910	do
Swallow, No. 2 [5]	do		18 0	3 4	1 4	1917	Milan, Ill
Trout	do		26 0	5 3	1 3	1910	do
Viola	do		26 0	5 0	1 8	1917	do
Violet	do		26 0	5 3	1 3	1912	do
Wacouta	do		28 0	5 2	1 3	1913	St. Paul, Minn
Wasp	do		26 0	5 3	1 3	1909	Keokuk, Iowa
Beetle	do		26 0	5 1	1 5	1908	do
Bittern	do		20 0	5 9	1 8	1911	Rock Falls, Ill
Coot	do		20 0	5 9	1 8	1912	do
Crane	do		20 0	5 9	1 8	1912	do
Curlew	do		20 0	5 9	1 8	1911	do
Firefly	do		26 0	5 1	1 5	1909	Keokuk, Iowa
Gnat	do		25 0	5 1	1 5	1909	do
Gull	do		20 0	5 9	1 8	1912	Rock Falls, Ill
Locust	do		26 0	5 1	1 5	1909	Keokuk, Iowa
Loon	do		26 0	6 0	1 6	1908	do
Mosquito	do		26 0	5 1	1 5	1909	do
Moth	do		26 0	5 1	1 5	1909	do
Plover	do		20 0	5 9	1 8	1911	Rock Falls, Ill
Snipe	do		20 0	5 4	2 1	1908	Keokuk, Iowa
No. 33	Pile-driver and grader		60 0	18 0	4 0	1903	do
No. 503	Pile-driver and derrick-boat.	58.00	66 0	22 0	4 6	1914	Milan, Ill

[1] Condemned.

[2] Not regularly in use.

[3] Condemned 1917. Sunk and lost in deep water on Rock Island rapids.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1913	St. Paul, Minn.	Wood.	$1,724.00	$983.77	Good.	$95.39	Mississippi River, Missouri River to Minneapolis.
1912	do.	do.	1,557.00	659.51	do.	120.53	Do.
1903	La Crosse, Wis.	do.	1,500.00	424.07	Fair.	47.41	Do.
1912	St. Paul, Minn.	do.	1,557.00	707.05	Good.	47.31	Do.
		do.	812.00	787.93	do.	182.80	Do.
		do.	6,744.93	6,744.93	do.		Do.
1913	St. Paul, Minn.	do.	1,724.00	713.37	do.	96.25	Do.
1903	Red Wing, Minn.	do.	1,975.00	333.42	Poor.		Do.
		do.	800.00	488.18	Fair.	81.52	Illinois and Mississippi Canal
1912	St. Louis, Mo.	do.	950.00	525.42	Poor.	43.95	Do.
1913	St. Paul, Minn.	do.	1,724.00	863.09	Good.	150.68	Mississippi River, Missouri River to Minneapolis.
		do.	214.00	179.36	Poor.	41.08	Do.
		do.	633.00	506.40	Good.		Do.
		do.	810.00	579.43	do.	474.07	Do.
		do.	365.00	145.77	Fair.		Do.
		do.	300.00	437.77	Poor.	257.94	Do.
		do.	613.00	613.00	Good.		Do.
		do.	291.00	246.85	Fair.	65.96	Do.
		do.	284.00	372.73	Good.	178.91	Do.
1913	St. Paul, Minn.	do.	589.00	476.24	Fair.	96.20	Do.
		do.	285.00	60.62	Poor.		Do.
		do.	245.00	453.38	Fair.	117.24	Do.
							Do.
1913	St. Paul, Minn.	do.	589.00	427.11	Good.	40.38	Do.
		do.	581.51	305.18	do.		Do.
		do.	245.00	125.26	Poor.		Do.
							Do.
		do.	241.00	194.69	Poor.	78.99	Do.
		do.	262.00	201.99	do.	96.10	Do.
		do.	241.00	267.74	Fair.	110.82	Do.
		do.	237.00	273.01	Good.	105.36	Do.
		do.	191.00	299.38	Poor.	101.83	Do.
		do.	300.00	263.46	Good.	60.98	Do.
		do.	280.00	252.40	do.	60.72	Do.
1913	St. Paul, Minn.	do.	589.00	497.84	Fair.	119.06	Do.
		do.	282.00	256.58	Good.	63.94	Do.
							Do.
		do.	353.00	268.06	Fair.	91.07	Do.
		do.	289.00	223.95	Poor.		Do.
		do.	129.04	103.23	Good.		Do.
		do.	363.00	190.98	Fair.		Do.
		do.	631.00	507.36	Good.	3.20	Do.
		do.	284.00	164.87	Fair.		Do.
1913	St. Paul, Minn.	do.	589.00	329.84	Good.	34.71	Do.
		do.	350.00	75.56	Fair.		Do.
		do.	200.00	137.21	do.	17.00	Illinois and Mississippi Canal.
		do.	333.00	179.14	do.	49.30	Do.
		do.	413.00	169.13	Good.		Do.
		do.	413.00	177.94	Fair.	26.66	Do.
		do.	333.00	167.71	do.	25.51	Do.
		do.	300.00	169.81	do.	32.02	Do.
		do.	300.00	161.16	do.	34.87	Do.
		do.	413.00	186.38	do.	19.34	Do.
		do.	300.00	148.27	do.	23.51	Do.
		do.	200.00	164.07	do.	23.69	Do.
		do.	300.00	149.38	do.	25.73	Do.
		do.	300.00	169.53	do.	29.22	Do.
		do.	333.00	148.58	do.	39.16	Do.
		do.	200.00	146.77	do.	24.38	Do.
		do.	1,400.00	223.89	Good.	54.38	Mississippi River, Missouri River to Minneapolis.
		Steel and wood.	3,011.00	3,842.56	do.	337.56	Do.

[4] Condemned 1917.

[5] Rebuilt 1917.

TABLE 3.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 297	Derrickboat		70 0	26 0	4 0	1909	Milan, Ill.
No. 319	do		100 0	20 0	4 6	1908	do
No. 476	do		110 0	24 0	5 0	1913	Keokuk, Iowa
No. 61	Drillboat						
No. 426	do	272.00	132 0	32 0	6 0	1912	Le Claire, Iowa
No. 208[1]	Building boat						
No. 209	do		140 0	22 0	4 0	1903	St. Paul, Minn.
No. 333	do		160 0	26 0	4 6	1909	South Stillwater, Minn.
No. 338	do		120 0	20 0	4 0	1909	Fountain City, Wis.
No. 359	do		160 0	26 0	4 3½	1911	Keokuk, Iowa
No. 366	do		160 0	26 0	4 6	1912	South Stillwater, Minn.
No. 410	do	125.00	120 0	20 0	4 3	1912	Fountain City, Wis.
No. 473	do		160 0	26 0	4 3½	1912	Keokuk, Iowa
No. 474	do		160 0	26 0	4 3½	1912	do
No. 475	do		160 0	26 0	4 3½	1912	do
No. 522	do		140 0	26 0	4 3	1915	Fountain City, Wis.
No. 336	Grasshopper		36 0	16 0	2 0	1909	do
No. 337	do		36 0	16 0	2 0	1909	do
No. 339	do		40 0	30 0	3 0	1909	Dubuque, Iowa
No. 365	do		40 0	36 0	4 0	1911	Keokuk, Iowa
No. 425	do		40 0	30 0	3 3	1912	Milan, Ill.
No. 435	do		36 0	16 0	2 0	1911	Fountain City, Wis.
No. 490	do		48 0	30 0	3 3	1912	Keokuk, Iowa
No. 491	do		48 0	30 0	3 3	1912	do
No. 13	Dumpboat (90-ton)		73 0	18 0	5 6	1909	Milan, Ill.
No. 14	do		73 0	18 0	5 6	1909	do
No. 15	do		73 0	18 0	5 6	1909	do
No. 16	do		73 0	18 0	5 6	1909	do
No. 17	do		73 0	18 0	6 0	1915	do
No. 18	do		73 0	18 0	6 0	1915	do
No. 19	do		73 0	18 0	6 0	1915	do
No. 20	do		73 0	18 0	6 0	1915	do
No. 30	Magazine boat		20 0	10 0	2 3	1893	Keokuk, Iowa
No. 511	do		24 0	16 0	2 5	1913	Milan, Ill.
No. 28	Loading boat		28 0	6 0	2 0	1893	Keokuk, Iowa
No. 107	do		20 0	6 0	1 8	1893	do
No. 426-1	do		55 0	6 0	1 5	1913	Milan, Ill.
No. 426-2	do		55 0	6 0	1 5	1913	do
No. 207[3]	Spudboat		100 0	20 0	4 0	1903	Keokuk, Iowa
No. 275	do		100 0	20 0	4 6	1909	Fountain City, Wis.
No. 427	do		50 0	18 0	4 0	1911	Milan, Ill.
No. 428	do		50 0	18 0	4 0	1911	do
No. 205	Sounding boat		50 0	18 0	3 0	1913	Keokuk, Iowa
No. 230	Storeboat		80 0	20 0	4 0	1914	Fountain City; Wis.
No. 234	do		80 0	18 0	3 0	1908	Dubuque, Iowa.
No. 334	do		80 0	18 0	3 0	1909	South Stillwater, Minn.
No. 335	do		100 0	20 0	3 6	1909	Fountain City, Wis.
No. 368	do		96 0	20 0	3 0	1912	South Stillwater, Minn.
No. 416	do		60 0	20 0	3 0	1911	Milan, Ill.
No. 506	do		100 0	20 0	4 0	1913	do
No. 12	Office boat		34 0	14 0	3 2	1895	Keokuk, Iowa
No. 20	do		64 0	18 0	3 0	1897	Fountain City, Wis.
No. 41[1]	do						
No. 48[1]	do						
No. 51	do		40 0	12 0	2 0	1894	Fountain City, Wis.
No. 52	do		58 0	18 0	3 6	1895	do
No. 66	do		32 0	12 0	2 0	1893	Keokuk, Iowa
No. 67	do		66 0	18 0	3 6	1893	La Crosse, Wis.
No. 68	do		32 0	12 0	2 0	1903	Keokuk, Iowa
No. 69	do		50 0	16 0	3 0	1893	La Crosse, Wis.
No. 81	do		32 0	12 0	2 0	1893	Keokuk, Iowa
No. 85	do		32 0	12 0	2 0	1893	do
No. 86[1]	do						
No. 90	do		32 0	12 0	2 0	1893	Keokuk, Iowa

[1] Condemned 1917.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$1,253.00	$2,185.66	Fair...	$630.85	Mississippi River, Missouri River to Minneapolis.
		...do...	3,045.00	3,377.86	Good..	1,292.79	Do.
		...do...	6,140.00	2,753.12	...do...	345.18	Do.
							Do.
1912	Le Claire, Iowa	Steel..	35,547.00	13,200.22	Good..	226.36	Do.
							Do.
		Wood.	2,141.00	1,452.05	Good..	53.75	Do.
		...do...	4,011.00	1,584.26	...do...	229.04	Do.
		...do...	1,663.00	332.49	...do...	13.79	Do.
		...do...	6,015.00	2,664.19	...do...	698.29	Do.
		...do...	6,713.00	2,369.58	...do...	88.84	Do.
		...do...	2,089.00	1,480.16	...do...	64.19	Do.
		...do...	5,789.00	2,002.32	...do...		Do.
		...do...	5,390.00	1,881.37	...do...	38.57	Do.
		...do...	5,217.00	1,781.16	...do...		Do.
		...do...	6,297.76	3,320.58	...do...	12.25	Do.
		...do...	438.00	133.30	...do...	7.75	Do.
		...do...	443.00	151.58	...do...	51.34	Do.
		...do...	580.00	130.66	...do...	6.08	Do.
		...do...	831.00	337.45	...do...	74.19	Do.
		...do...	1,137.00	412.03	...do...	12.22	Do.
		...do...	300.00	152.08	...do...	46.65	Do.
		...do...	1,158.00	379.29	...do...		Do.
		...do...	1,417.00	484.97	...do...		Do.
		...do...	1,616.00	522.74	Fair...	33.17	Do.
		...do...	2,009.00	592.03	...do...	23.96	Do.
		...do...	2,349.00	756.54	Poor..	22.96	Do.
		...do...	2,430.00	780.55	...do...	24.88	Do.
		...do...	3,050.64	1,638.67	Good..	87.63	Do.
		...do...	2,935.17	1,786.78	...do...	346.66	Do.
		...do...	3,004.80	1,768.88	...do...	280.10	Do.
		...do...	2,890.63	1,544.22	...do...	72.58	Do.
		...do...	225.00	82.25	Fair...		Do.
		...do...	355.00	145.98	Good..		Do.
		...do...	130.00	60.62	...do...		Do.
		...do...	130.00	71.64	...do...		Do.
		...do...	159.35	77.06	Fair...	5.02	Do.
		...do...	159.35	71.79	...do...	4.00	Do.
		...do...	1,137.20	508.04	Good..	100.28	Do.
		...do...	1,159.00	703.96	...do...	39.63	Do.
		...do...	1,188.00	503.33	...do...		Do.
		...do...	580.00	249.59	...do...		Do.
		...do...	915.00	545.26	Fair...	88.40	Do.
		...do...	907.47	629.93	...do...	190.19	Do.
		...do...	1,444.00	452.18	Good..		Do.
		...do...	1,316.00	413.19	...do...	18.49	Do.
		Wood.	2,189.00	769.83	...do...	52.86	Do.
		...do...	4,013.00	1,414.14	...do...	25.47	Do.
		...do...	1,082.00	403.17	...do...	10.38	Do.
		...do...	1,851.00	675.43	...do...	39.65	Do.
		...do...	195.00	74.83	...do...	30.00	Do.
		...do...	1,452.00	482.44	Fair...	2.19	Do.
							Do.
							Do.
		Wood.	287.00	185.85	Good..	136.40	Do.
		...do...	1,018.00	787.98	...do...	499.35	Do.
		...do...	201.00	30.12	Poor..		Do.
		...do...	1,724.00	908.04	Good..	494.78	Do.
		...do...	208.00	194.80	Fair...	26.35	Do.
		...do...	376.00	466.35	Good..	26.69	Do.
		...do...	201.00	56.29	...do...	6.87	Do.
		...do...	201.00	257.16	...do...	44.00	Do.
							Do.
		Wood.	201.00	54.49	Poor..		Do.

[3] Formerly barge No. 207.

TABLE 3.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 119	Office boat		40	0	14	0	2	0	1901	North La Crosse, Wis.
No. 204	do		60	0	18	0	4	0	1902	Fountain City, Wis.
No. 413	do		36	0	12	0	2	0	1910	Dubuque, Iowa
No. 415	do		45	0	20	0	3	0	1911	Milan, Ill.
No. 429	do		40	0	14	0	3	0	1911	South Stillwater, Minn.
No. 430	do		40	0	14	0	3	6	1912	Fountain City, Wis.
No. 431	do		36	0	12	0	3	0	1911	Dubuque, Iowa
No. 432	do		40	0	14	0	3	0	1911	Milan, Ill.
No. 433	do		40	0	14	0	3	0	1911	Keokuk, Iowa
No. 434	do		40	0	15	0	3	0	1902	do
Rambler	Houseboat		48	0	15	0	3	0	1902	Clinton, Iowa
No. 11	Quarterboat		75	0	20	0	3	0	1894	Keokuk, Iowa
No. 17	do		70	0	24	0	3	0	1893	Stillwater, Minn.
No. 47	do		75	0	20	0	3	0	1908	Keokuk, Iowa
No. 65	do		40	0	16	0	2	0	1907	La Crosse, Wis.
No. 71	do		75	0	20	0	3	0	1907	Keokuk, Iowa
No. 75	do		75	0	20	0	3	6	1907	Fountain City, Wis.
No. 91	do		50	0	12	0	3	0	1905	Milan, Ill.
No. 92	do		50	0	12	0	3	0	1910	Keokuk, Iowa
No. 118	do		70	0	20	0	3	0	1910	do
No. 120	do		40	0	14	0	3	6	1907	Fountain City, Wis.
No. 121	do		52	0	16	0	3	6	1903	Milan, Ill.
No. 122	do		52	0	16	0	3	6	1903	do
No. 123	do		52	0	16	0	3	6	1908	do
No. 183	do		100	0	20	0	3	0	1909	Keokuk, Iowa
No. 184	do		60	0	18	0	3	0	1910	Milan, Ill.
No. 202	do		70	0	20	0	3	0	1907	Fountain City, Wis.
No. 231 (Sangamon)	do		100	0	20	0	4	3	1904	Kampsville, Ill.
No. 237	do		68	0	22	0	3	0	1909	South Stillwater, Minn.
No. 262	do		66	0	22	0	3	0	1909	Fountain City, Wis.
No. 301	do		75	0	20	0	4	0	1909	Keokuk, Iowa
No. 342	do		80	0	20	0	3	0	1910	do
No. 343	do		70	0	20	0	3	0	1910	Milan, Ill.
No. 344	do		70	0	20	0	3	0	1910	do
No. 345	do		70	0	20	0	3	0	1911	do
No. 346	do		80	0	20	0	3	0	1911	Keokuk, Iowa
No. 347	do		80	0	20	0	3	0	1911	do
No. 348	do		80	0	20	0	3	0	1911	do
No. 367	do		78	0	26	0	3	0	1912	South Stillwater, Minn.
No. 411	do		76	0	26	0	4	0	1910	Fountain City, Wis.
No. 412	do		82	0	20	0	3	0	1911	Dubuque, Iowa
No. 414	do		70	0	20	0	3	0	1911	Milan, Ill.
No. 492	do		70	9	18	0	3	6	1912	Fountain City, Wis.
No. 504	do		75	0	20	0	3	6	1913	Milan, Ill.
No. 505	do		75	0	20	0	3	0	1913	do
No. 512	do		76	0	18	0	3	8	1913	Fountain City, Wis.
No. 513	do		76	0	18	0	3	8	1914	do
No. 514	do		76	0	18	0	3	8	1914	do
No. 238	Fuel flat (50-ton)	18.00	68	0	16	0	4	6	1909	South Stillwater, Minn.
No. 239	do	18.00	68	0	16	0	4	6	1909	do
No. 263	do	18.00	68	0	16	0	4	6	1909	Fountain City, Wis.
No. 264	do	18.00	68	0	16	0	4	6	1909	do
No. 302	Fuel flat (150-ton)	50.00	110	0	24	0	5	0	1909	Keokuk, Iowa
No. 330	Fuel flat (50-ton)	18.00	66	0	16	0	4	6	1909	Fountain City, Wis.
No. 331	do	18.00	66	0	16	0	4	6	1909	do
No. 355	Fuel flat (150-ton)	50.00	104	0	24	0	5	0	1910	Keokuk, Iowa
No. 356	do	50.00	104	0	24	0	5	0	1911	do
No. 357	do	50.00	104	0	24	0	5	0	1912	do
No. 358	do	50.00	104	0	24	0	5	0	1912	do
No. 369	Fuel flat (50-ton)	18.00	68	0	16	0	4	9	1912	South Stillwater, Minn.
No. 370	do	18.00	68	0	16	0	4	9	1912	do

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$282.00	$195.78	Good..		Mississippi River, Missouri River to Minneapolis.
		...do...	1,744.00	979.90	...do...	$12.29	Do.
		...do...	645.00	380.26	...do...	34.58	Do.
		...do...	1,369.00	553.87	...do...	18.44	Do.
		...do...	632.00	242.03	...do...	2.00	Do.
		...do...	652.00	385.98	...do...	147.74	Do.
		...do...	614.00	258.84	...do...	42.12	Do.
		...do...	587.00	333.33	...do...	43.96	Do.
		...do...	783.00	312.63	...do...	57.14	Do.
		...do...	878.00	284.98	...do...		Do.
1907	Rock Island, Ill.	...do..	1,500.00	616.51	Fair...	40.32	Illinois and Mississippi Canal.
		...do..	1,675.00	340.76	Good..		Mississippi River, Missour River to Minneapolis.
1881	Stillwater, Minn.	...do..	1,414.00	701.39	...do..		Do.
		...do..	1,561.00	704.82	...do..	123.40	Do.
		...do..	416.00	368.72	...do..	8.32	Do.
		...do..	1,138.00	367.12	...do..	60.23	Do.
		...do..	700.00	623.18	...do..	105.62	Do.
		...do..	453.00	245.27	...do..		Do.
		...do..	384.00	204.38	...do..	33.60	Do.
		...do..	1,414.00	453.20	Fair...	10.10	Do.
		...do..	551.00	174.12	Poor..		Do.
		...do..	430.00	275.30	Fair...	4.65	Do.
1892	Rock Island, Ill.	...do..	430.00	180.55	...do..		Do.
		...do..	430.00	240.87	Good..	16.48	Do.
		...do..	2,698.00	771.65	...do..	43.77	Do.
		...do..	871.00	580.04	...do..	156.33	Do.
		...do..	1,329.00	639.63	Fair...	127.08	Do.
1905	Illinois River....	...do..	2,970.00	1,495.26	Good..	661.39	Do.
		...do..	3,929.00	1,072.58	...do..	42.46	Do.
		...do..	2,492.00	927.46	...do..	16.75	Do.
		...do..	3,027.00	1,420.74	...do..	363.55	Do.
		...do..	3,402.00	1,143.77	...do..	102.63	Do.
		...do..	3,003.00	712.92	...do..	8.90	Do.
		...do..	2,993.00	1,130.51	...do..	83.20	Do.
		...do..	2,474.00	1,351.98	...do..	399.54	Do.
		...do..	3,604.00	1,080.73	...do..	61.70	Do.
		...do..	3,382.00	950.75	...do..	68.30	Do.
		...do..	3,748.00	1,173.66	...do..	38.07	Do.
		...do..	5,676.00	1,974.70	...do..		Do.
		...do..	2,624.00	1,004.13	Fair...	90.38	Do.
		...do..	3,748.00	1,153.95	Good..	42.16	Do.
		...do..	3,105.00	1,854.46	...do..	92.39	Do.
		...do..	3,148.00	1,637.79	...do..	35.04	Do.
		...do..	4,011.00	1,704.75	...do..	77.45	Do.
		...do..	3,501.00	1,503.46	...do..	59.76	Do.
		...do..	4,306.00	2,000.26	...do..	153.70	Do.
		...do..	4,301.00	2,350.59	...do..	98.51	Do.
		...do..	4,300.00	2,324.56	...do..	74.53	Do.
		...do..	758.00	200.92	...do..	16.69	Do.
		...do..	793.00	178.21	...do..	9.34	Do.
		...do..	702.00	184.49	...do..		Do.
		...do..	693.00	190.96	...do..	8.13	Do.
		...do..	1,768.00	579.32	...do..	61.73	Do.
		...do..	717.00	181.37	...do..	6.00	Do.
		...do..	718.00	204.71	...do..		Do.
		...do..	2,283.00	746.78	...do..	4.20	Do.
		...do..	2,105.00	770.17	Fair...		Do.
		...do..	2,332.00	764.72	Good..		Do.
		...do..	2,340.00	777.49	...do..		Do.
		...do..	952.00	330.16	...do..	9.16	Do.
		...do..	1,059.00	351.43	...do..	5.63	Do.

TABLE 3.—*Statement of floating plant owned by the United States*

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 408	Fuel-flat (65-ton)	25.00	80	0	20	0	4	8	1911	Fountain City, Wis.
No. 409	do	25.00	80	0	20	0	4	8	1911	do
No. 486	Fuel flat (150-ton)	50.00	104	0	24	0	5	0	1913	Milan, Ill
No. 487	do	50.00	104	0	24	0	5	0	1913	do
No. 488	do	50.00	104	0	24	0	5	0	1913	do
No. 493	Fuel flat (65-ton)	25.00	80	0	24	0	5	4	1913	do
No. 494	do	25.00	80	0	24	0	5	4	1913	do
No. 495	Fuel flat (150-ton)	50.00	104	0	24	0	5	4	1913	do
No. 496	do	50.00	104	0	24	0	5	4	1913	do
No. 497	do	50.00	104	0	24	0	5	4	1913	do
No. 498	do	50.00	104	0	24	0	5	4	1913	do
No. 499	do	50.00	104	0	24	0	5	4	1913	do
No. 500	do	50.00	104	0	24	0	5	4	1913	do
No. 501	do	50.00	104	0	24	0	5	4	1913	do
No. 502	do	50.00	104	0	24	0	5	4	1913	Keokuk, Iowa
No. 523	Fuel flat (50-ton)	18.00	68	0	16	0	4	6	1915	Fountain City, Wis.
No. 524	do	18.00	68	0	16	0	4	6	1915	do
No. 525	do	18.00	68	0	16	0	4	6	1915	do
No. 1 M. S	Barge (100-ton)	36.00	100	0	20	0	4	7	1910	Milan, Ill
No. 2 M. S	do	36.00	100	0	20	0	4	7	1910	do
No. 3 M. S	do	36.00	100	0	20	0	4	7	1910	do
No. 4 M. S	do	36.00	100	0	20	0	4	7	1910	do
"G"	Barge (10-ton)	6.00	45	0	12	0	3	0	1907	Keokuk, Iowa
No. 4	Barge (150-ton)	51.00	110	0	24	0	4	6	1909	Dubuque, Iowa
No. 7	do	51.00	110	0	24	0	4	6	1909	do
No. 153	do	51.00	110	0	24	0	4	6	1909	do
No. 161	do	51.00	110	0	24	0	4	6	1910	do
No. 186	Barge (100-ton)	36.00	100	0	20	0	4	0	1906	Milan, Ill
No. 210	do	36.00	100	0	20	0	4	0	1903	St. Paul, Minn
No. 211	do	36.00	100	0	20	0	4	0	1903	do
No. 212	do	36.00	100	0	20	0	4	0	1903	do
No. 213	do	36.00	100	0	20	0	4	0	1903	do
No. 214	Barge (150-ton)	51.00	110	0	24	0	4	6	1903	do
No. 215	do	51.00	110	0	24	0	4	6	1904	do
No. 219	do	51.00	110	0	24	0	4	6	1904	do
No. 225[1]	Barge (175-ton)									
No. 226	Barge (100-ton)	36.00	100	0	20	0	4	0	1904	do
No. 227	do	36.00	100	0	20	0	4	0	1904	do
No. 228	do	36.00	100	0	20	0	4	0	1904	do
No. 229	do	36.00	100	0	20	0	4	0	1904	do
No. 240	Barge (150-ton)	51.00	110	0	24	0	5	0	1908	South Stillwater, Minn.
No. 241	do	51.00	110	0	24	0	5	0	1908	do
No. 242	do	51.00	110	0	24	0	5	0	1908	do
No. 243	do	51.00	110	0	24	0	5	0	1908	do
No. 244	do	51.00	110	0	24	0	5	0	1908	do
No. 245	do	51.00	110	0	24	0	5	0	1908	do
No. 246	do	51.00	110	0	24	0	5	0	1908	do
No. 247	do	51.00	110	0	24	0	5	0	1908	do
No. 248	do	51.00	110	0	24	0	5	0	1908	do
No. 249	do	51.00	110	0	24	0	5	0	1909	do
No. 250	do	51.00	110	0	24	0	5	0	1909	do
No. 251	do	51.00	110	0	24	0	5	0	1909	do
No. 252	do	51.00	110	0	24	0	5	0	1909	do
No. 253	do	51.00	110	0	24	0	5	0	1909	do
No. 254	do	51.00	110	0	24	0	5	0	1909	do
No. 255	do	51.00	110	0	24	0	5	0	1909	do
No. 256	do	51.00	110	0	24	0	5	0	1909	do
No. 257	do	51.00	110	0	24	0	5	0	1909	do
No. 258	do	51.00	110	0	24	0	5	0	1909	do
No. 259	do	51.00	110	0	24	0	5	0	1909	do
No. 265	Barge (100-ton)	36.00	100	0	20	0	4	6	1908	Fountain City, Wis.
No. 266	do	36.00	100	0	20	0	4	6	1908	do
No. 267	do	36.00	100	0	20	0	4	6	1908	do

[1] Condemned, 1917. Sunk and lost in deep water on Rock Island rapids.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$1,146.00	$385.30	Fair	$5.25	Mississippi River, Missouri River to Minneapolis.
		do	1,191.28	390.02	Good	6.25	Do.
		do	2,160.00	750.49	do	44.09	Do.
		do	2,252.00	1,050.62	do	377.29	Do.
		do	2,257.00	924.46	do		Do.
		do	1,628.00	641.97	do		Do.
		do	1,650.00	540.67	do		Do.
		do	2,371.00	1,026.02	do		Do.
		do	2,253.00	922.83	do		Do.
		do	2,144.00	936.06	do	72.34	Do.
		do	2,172.00	958.78	do	62.16	Do.
		do	2,203.00	983.09	do	40.18	Do.
		do	2,223.00	911.62	do	1.31	Do.
		do	2,344.00	1,042.29	do	52.71	Do.
		do	2,240.00	756.59	do		Do.
		do	794.67	406.87	do		Do.
		do	793.83	407.56	do		Do.
		do	795.16	410.24	do		Do.
		do	1,032.00	388.84	do	4.91	Illinois amd Mississippi Canal.
		do	1,238.00	450.42	do	3.25	Do.
		do	1,575.00	503.06	do	18.07	Do.
		do	1,610.00	548.23	do	32.84	Do.
		do	207.00	89.70	do	37.14	Des Moines Rapids Canal.
		do	1,460.00	600.30	do	1.00	Mississippi River, Missouri River to Minneapolis.
		do	1,447.00	559.82	Fair		Do.
1893	Quincy, Ill.	do	1,600.00	524.66	Poor		Do.
1894	Stillwater, Minn	do	1,600.00	484.06	Fair		Do.
1895	Rock Island, Ill.	do	790.00	134.58	Poor	12.56	Do.
1903	St. Paul, Minn.	do	910.00	331.03	do		Do.
1903	do	do	910.00	362.16	do		Do.
		do	910.00	396.22	do		Do.
		do	910.00	282.95	do		Do.
		do	1,361.00	347.74	do		Do.
		do	1,361.00	297.40	do		Do.
		do	1,361.00	327.54	do	10.68	Do.
							Do.
		Wood.	801.00	350.16	do	13.56	Do.
		do	840.00	309.59	do	13.56	Do.
		do	828.00	342.36	Fair		Do.
		do	828.00	381.04	Good	28.54	Do.
		do	2,130.00	633.25	do	5.69	Do.
		do	1,830.00	704.78	do	9.56	Do.
		do	1,807.00	596.97	do	8.70	Do.
		do	1,739.00	603.54	do		Do.
		do	1,758.00	615.38	do	9.25	Do.
		do	1,669.00	710.42	do	20.25	Do.
		do	1,608.00	542.38	Fair	2.43	Do.
		do	1,662.00	552.76	Good		Do.
		do	1,677.00	541.63	Fair	7.71	Do.
		do	1,675.00	576.11	Good		Do.
		do	1,622.00	521.01	Fair		Do.
		do	1,637.00	785.27	Good	248.37	Do.
		do	1,719.00	578.42	do	3.88	Do.
		do	1,678.00	538.18	Fair		Do.
		do	1,659.00	500.29	do	2.34	Do.
		do	1,650.00	495.79	do		Do.
		do	1,649.00	492.57	do		Do.
		do	1,611.00	535.06	do	2.34	Do.
		do	1,680.00	523.70	do	2.10	Do.
		do	1,639.00	622.65	do	1.87	Do.
		do	1,159.00	357.33	do		Do.
		do	1,155.00	394.46	do	13.56	Do.
		do	1,098.00	340.92	do		Do.

TABLE 3.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 268	Barge (100-ton)	36.00	100	0	20	0	4	6	1908	Fountain City, Wis.
No. 269	do	36.00	100	0	20	0	4	6	1909	do
No. 270	do	36.00	100	0	20	0	4	6	1909	do
No. 271	do	36.00	100	0	20	0	4	6	1909	do
No. 272	do	36.00	100	0	20	0	4	6	1909	do
No. 273	do	36.00	100	0	20	0	4	6	1909	do
No. 274	do	36.00	100	0	20	0	4	6	1909	do
No. 276	do	36.00	100	0	20	0	4	6	1909	do
No. 277	do	36.00	100	0	20	0	4	6	1909	do
No. 278	do	36.00	100	0	20	0	4	6	1909	do
No. 279	do	36.00	100	0	20	0	4	6	1909	do
No. 280	do	36.00	100	0	20	0	4	6	1909	do
No. 281	do	36.00	100	0	20	0	4	6	1909	do
No. 282	do	36.00	100	0	20	0	4	6	1909	do
No. 283	do	36.00	100	0	20	0	4	6	1909	do
No. 284	do	36.00	100	0	20	0	4	6	1909	do
No. 285	do	36.00	100	0	20	0	4	6	1908	do
No. 286	do	36.00	100	0	20	0	4	6	1908	Milan, Ill.
No. 287	do	36.00	100	0	20	0	4	6	1908	do
No. 288	do	36.00	100	0	20	0	4	6	1908	do
No. 289	do	36.00	100	0	20	0	4	6	1908	do
No. 290	do	36.00	100	0	20	0	4	6	1908	do
No. 291	do	36.00	100	0	20	0	4	6	1908	do
No. 292	do	36.00	100	0	20	0	4	6	1908	do
No. 293	do	36.00	100	0	20	0	4	6	1908	do
No. 294	do	36.00	100	0	20	0	4	6	1908	do
No. 295	do	36.00	100	0	20	0	4	6	1908	do
No. 296	do	36.00	100	0	20	0	4	6	1908	do
No. 298	do	36.00	100	0	20	0	4	6	1908	do
No. 299	do	36.00	100	0	20	0	4	6	1908	do
No. 303	do	36.00	100	0	20	0	4	6	1908	Keokuk, Iowa
No. 304	do	36.00	100	0	20	0	4	6	1908	do
No. 305	do	36.00	100	0	20	0	4	6	1908	do
No. 306	do	36.00	100	0	20	0	4	6	1908	do
No. 307	do	36.00	100	0	20	0	4	6	1908	do
No. 308	do	36.00	100	0	20	0	4	6	1908	do
No. 309	do	36.00	100	0	20	0	4	6	1908	do
No. 310	do	36.00	100	0	20	0	4	6	1908	do
No. 311	do	36.00	100	0	20	0	4	6	1909	do
No. 312	do	36.00	100	0	20	0	4	6	1909	do
No. 313	do	36.00	100	0	20	0	4	6	1909	do
No. 314	do	36.00	100	0	20	0	4	6	1909	do
No. 315	do	36.00	100	0	20	0	4	6	1909	do
No. 316	do	36.00	100	0	20	0	4	6	1909	do
No. 317	do	36.00	100	0	20	0	4	6	1909	do
No. 320	do	36.00	100	0	20	0	4	6	1909	Stillwater, Minn.
No. 321	do	36.00	100	0	20	0	4	6	1909	do
No. 322	do	36.00	100	0	20	0	4	6	1909	do
No. 323	do	36.00	100	0	20	0	4	6	1909	do
No. 324	do	36.00	100	0	20	0	4	6	1909	do
No. 325	do	36.00	100	0	20	0	4	6	1909	do
No. 326	do	36.00	100	0	20	0	4	6	1909	do
No. 327	do	36.00	100	0	20	0	4	6	1909	do
No. 328	do	36.00	100	0	20	0	4	6	1909	do
No. 329	do	36.00	100	0	20	0	4	6	1909	do
No. 340	Barge (30-ton)	20.00	60	0	15	0	3	0	1910	South Stillwater, Minn.
No. 341	Barge (8-ton)	10.00	29	0	8	0	1	6	1910	do
No. 360	Barge (100-ton)	36.00	100	0	20	0	4	6	1911	Keokuk, Iowa
No. 361	do	36.00	100	0	20	0	4	6	1912	do
No. 362	do	36.00	100	0	20	0	4	6	1912	do
No. 363	do	36.00	100	0	20	0	4	6	1912	do
No. 364	do	36.00	100	0	20	0	4	6	1912	do
No. 371	do	36.00	100	0	20	0	4	6	1912	South Stillwater, Minn.
No. 372	do	36.00	100	0	20	0	4	6	1912	do
No. 373	do	36.00	100	0	20	0	4	6	1912	do
No. 374	do	36.00	100	0	20	0	4	6	1912	do

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$1,160.00	$344.62	Fair...	$2.12	Mississippi River, Missouri River to Minneapolis.
		...do...	1,136.00	375.91	...do...		Do.
		...do...	1,160.00	417.30	Good..	13.56	Do.
		...do...	1,155.00	368.67	Fair...		Do.
		...do...	1,161.00	507.75	Good..	3.30	Do.
		...do...	1,153.00	576.61	Fair...	55.33	Do.
		...do...	1,155.00	378.83	...do...	13.56	Do.
		...do...	1,164.00	462.61	Good..	140.41	Do.
		...do...	1,194.00	469.62	...do...	149.27	Do.
		...do...	1,269.00	289.14	Fair...		Do.
		...do...	1,187.00	350.04	Good..		Do.
		...do...	1,169.00	350.21	...do...		Do.
		...do...	1,171.00	349.53	...do...		Do.
		...do...	1,145.00	444.75	Fair...	101.70	Do.
		...do...	1,169.00	373.46	...do...	13.56	Do.
		...do...	1,176.00	360.80	...do...	13.56	Do.
		...do...	1,207.00	757.45	Good..	299.06	Do.
		...do...	1,151.00	965.07	...do...	782.40	Do.
		...do...	1,140.00	439.53	Fair...	21.18	Do.
		...do...	1,130.00	764.68	...do...	58.74	Do.
		...do...	1,112.00	532.06	Good..	55.58	Do.
		...do...	1,193.00	842.44	Fair...	6.60	Do.
		...do...	1,100.00	335.71	Good..		Do.
		...do...	1,111.00	689.25	Fair...	54.28	Do.
		...do...	1,109.00	679.82	...do...		Do.
		...do...	1,106.00	364.71	...do...	13.74	Do.
		...do...	1,120.00	596.27	...do...		Do.
		...do...	1,101.00	887.34	...do...	240.00	Do.
		...do...	1,148.00	512.12	...do...		Do.
		...do...	1,120.00	772.88	...do...	65.00	Do.
		...do...	1,458.00	555.48	...do...	51.81	Do.
		...do...	1,420.00	599.86	Good..	145.64	Do.
		...do...	1,198.00	343.53	...do...	30.19	Do.
		...do...	1,168.00	664.27	...do...	283.21	Do.
		...do...	1,082.00	586.80	Fair...	186.52	Do.
		...do...	1,072.00	455.54	Good..		Do.
		...do...	1,061.00	499.35	...do...	37.34	Do.
		...do...	1,056.00	424.86	...do...	74.28	Do.
		...do...	1,123.00	437.40	Fair...	100.80	Do.
		...do...	1,080.00	431.63	Good..	25.36	Do.
		...do...	1,101.00	396.70	Fair...	53.33	Do.
		...do...	1,192.00	478.42	Good..	108.81	Do.
		...do...	1,177.00	541.78	...do...	19.39	Do.
		...do...	1,294.00	481.94	Fair...	13.56	Do.
		...do...	1,130.00	461.84	...do...	2.10	Do.
		...do...	1,116.00	344.53	Good..		Do.
		...do...	1,145.00	347.40	...do...		Do.
		...do...	1,044.00	460.08	...do...	147.59	Do.
		...do...	1,041.00	324.74	...do...		Do.
		...do...	1,011.00	346.54	...do...		Do.
		...do...	1,034.00	342.48	...do...		Do.
		...do...	1,008.00	343.31	...do...		Do.
		...do...	998.00	343.21	...do...		Do.
		...do...	997.00	342.49	...do...		Do.
		...do...	1,042.00	374.03	...do...		Do.
		...do...	432.00	200.46	...do...	107.22	Do.
		...do...	140.00	80.94	...do...	50.99	Do.
		...do...	1,667.00	585.75	...do...		Do.
		...do...	1,777.00	654.06	...do...	31.62	Do.
		...do...	1,666.00	648.89	...do...	35.13	Do.
		...do...	1,581.00	642.95	...do...	44.22	Do.
		...do...	1,675.00	667.62	...do...	45.65	Do.
		...do...	1,746.00	618.10	...do...	20.15	Do.
		...do...	1,649.00	559.10	...do...	12.47	Do.
		...do...	1,588.00	563.00	...do...	15.53	Do.
		...do...	1,547.00	640.39	...do...	157.30	Do.

TABLE 3.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 375	Barge (100-ton)	36.00	100 0	20 0	4 6	1912	South Stillwater, Minn.
No. 376	do	36.00	100 0	20 0	4 6	1912	do
No. 377	do	36.00	100 0	20 0	4 6	1912	do
No. 378	do	36.00	100 0	20 0	4 6	1912	do
No. 379	do	36.00	100 0	20 0	4 6	1912	do
No. 380	do	36.00	100 0	20 0	4 6	1912	do
No. 381	do	36.00	100 0	20 0	4 6	1912	do
No. 382	do	36.00	100 0	20 0	4 6	1912	do
No. 383	do	36.00	100 0	20 0	4 6	1912	do
No. 384	do	36.00	100 0	20 0	4 6	1912	do
No. 385	do	36.00	100 0	20 0	4 6	1912	do
No. 386	Barge (150-ton)	51.00	110 0	24 0	5 0	1912	do
No. 387	do	51.00	110 0	24 0	5 0	1912	do
No. 388	do	51.00	110 0	24 0	5 0	1912	do
No. 389	do	51.00	110 0	24 0	5 0	1912	do
No. 390	do	51.00	110 0	24 0	5 0	1912	do
No. 391	do	51.00	110 0	24 0	5 0	1912	do
No. 392	Barge (100-ton)	36.00	100 0	20 0	4 7	1912	Fountain City, Wis.
No. 393	do	36.00	100 0	20 0	4 7	1911	do
No. 394	do	36.00	100 0	20 0	4 7	1911	do
No. 395	do	36.00	100 0	20 0	4 7	1911	do
No. 396	do	36.00	100 0	20 0	4 7	1911	do
No. 397	do	36.00	100 0	20 0	4 7	1911	do
No. 398	do	36.00	100 0	20 0	4 7	1911	do
No. 399	do	36.00	100 0	20 0	4 7	1911	do
No. 400	do	36.00	100 0	20 0	4 7	1911	do
No. 401	do	36.00	100 0	20 0	4 7	1911	do
No. 402	do	36.00	100 0	20 0	4 7	1911	do
No. 403	do	36.00	100 0	20 0	4 7	1911	do
No. 404	do	36.00	100 0	20 0	4 7	1911	do
No. 405	do	36.00	100 0	20 0	4 7	1911	do
No. 406	do	36.00	100 0	20 0	4 7	1911	do
No. 407	do	36.00	100 0	20 0	4 7	1911	do
No. 417	do	36.00	100 0	20 0	4 7	1911	Milan, Ill.
No. 418	do	36.00	100 0	20 0	4 7	1911	do
No. 419	do	36.00	100 0	20 0	4 7	1911	do
No. 420	do	36.00	100 0	20 0	4 7	1911	do
No. 421	do	36.00	100 0	20 0	4 7	1911	do
No. 422	do	36.00	100 0	20 0	4 7	1911	do
No. 423	do	36.00	100 0	20 0	4 7	1911	do
No. 424	do	36.00	100 0	20 0	4 7	1911	do
No. 436	do	36.00	100 0	20 0	4 7	1912	Fountain City, Wis.
No. 437	do	36.00	100 0	20 0	4 7	1913	do
No. 438	do	36.00	100 0	20 0	4 7	1913	do
No. 439	do	36.00	100 0	20 0	4 7	1913	do
No. 440	do	36.00	100 0	20 0	4 7	1913	do
No. 441	do	36.00	100 0	20 0	4 7	1913	do
No. 442	do	36.00	100 0	20 0	4 7	1913	do
No. 443	do	36.00	100 0	20 0	4 7	1913	do
No. 444	do	36.00	100 0	20 0	4 7	1913	do
No. 445	do	36.00	100 0	20 0	4 7	1913	do
No. 446	do	36.00	100 0	20 0	4 7	1913	do
No. 447	do	36.00	100 0	20 0	4 7	1913	do
No. 448	do	36.00	100 0	20 0	4 7	1913	do
No. 449	do	36.00	100 0	20 0	4 7	1913	do
No. 450	do	36.00	100 0	20 0	4 7	1913	do
No. 451	do	36.00	100 0	20 0	4 7	1913	do
No. 452	do	36.00	100 0	20 0	4 7	1913	do
No. 453	do	36.00	100 0	20 0	4 7	1914	do
No. 454	Barge (150-ton)	51.00	110 0	24 0	5 0	1912	do
No. 455	do	51.00	110 0	24 0	5 0	1912	do
No. 456	do	51.00	110 0	24 0	5 0	1912	do
No. 457	do	51.00	110 0	24 0	5 0	1912	do
No. 458	Barge (100-ton)	36.00	100 0	20 0	4 7	1912	Milan, Ill.
No. 459	do	36.00	100 0	20 0	4 7	1912	do
No. 460	do	36.00	100 0	20 0	4 7	1912	do
No. 461	do	36.00	100 0	20 0	4 7	1912	do
No. 462	do	36.00	100 0	20 0	4 7	1912	do

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$1,515.00	$527.33	Good.	$14.84	Mississippi River, Missouri River to Minneapolis.
		do.	1,495.00	506.78	do.		Do.
		do.	1,537.00	554.91	do.	13.56	Do.
		do.	1,477.00	514.88	do.	14.84	Do.
		do.	1,469.00	488.96	do.		Do.
		do.	1,482.00	537.39	do.		Do.
		do.	1,412.00	466.94	do.		Do.
		do.	1,515.00	512.40	do.	14.84	Do.
		do.	1,447.00	501.14	do.		Do.
		do.	1,561.00	531.14	do.	14.84	Do.
		do.	1,562.00	519.68	do.		Do.
		do.	2,202.00	750.78	do.		Do.
		do.	2,088.00	671.86	do.	5.26	Do.
		do.	1,928.00	640.91	do.		Do.
		do.	1,953.00	653.24	do.		Do.
		do.	2,028.00	664.37	do.		Do.
		do.	2,375.00	903.76	do.	147.45	Do.
		do.	1,248.00	438.80	do.	13.56	Do.
		do.	1,260.00	444.00	do.	13.56	Do.
		do.	1,242.00	438.29	do.	13.55	Do.
		do.	1,280.00	450.87	do.	13.56	Do.
		do.	1,312.00	558.78	do.	69.19	Do.
		do.	1,330.00	543.74	do.	105.50	Do.
		do.	1,310.00	459.13	do.	13.56	Do.
		do.	1,418.00	512.77	do.	13.56	Do.
		do.	1,424.00	457.89	do.	13.56	Do.
		do.	1,411.00	482.48	do.	13.56	Do.
		do.	1,455.00	592.11	do.	170.33	Do.
		do.	1,451.00	472.51	do.	13.56	Do.
		do.	1,455.00	469.84	do.	13.56	Do.
		do.	1,451.00	582.75	do.	13.56	Do.
		do.	1,445.00	472.54	do.	13.56	Do.
		do.	1,442.00	484.56	do.	13.56	Do.
		do.	1,631.00	550.50	do.	27.15	Do.
		do.	1,476.00	536.15	do.	2.61	Do.
		do.	1,511.00	556.77	do.	38.80	Do.
		do.	1,460.00	572.35	do.	37.27	Do.
		do.	1,500.00	582.80	do.	48.53	Do.
		do.	1,534.00	568.90	do.	61.46	Do.
		do.	1,537.00	469.82	do.	13.56	Do.
		do.	1,536.00	527.46	do.	25.02	Do.
		do.	1,398.00	467.65	do.		Do.
		do.	1,416.00	469.14	do.		Do.
		do.	1,426.00	478.26	do.		Do.
		do.	1,413.00	270.65	do.	1.50	Do.
		do.	1,481.00	540.02	do.	13.56	Do.
		do.	1,453.00	475.54	do.		Do.
		do.	1,438.00	495.51	do.	13.56	Do.
		do.	1,462.00	501.97	do.	13.56	Do.
		do.	1,464.00	521.41	do.	16.24	Do.
		do.	1,463.00	479.23	do.		Do.
		do.	1,460.00	652.48	do.	13.55	Do.
		do.	1,465.00	754.94	do.		Do.
		do.	1,462.00	753.28	do.		Do.
		do.	1,460.00	765.85	do.	13.56	Do.
		do.	1,467.00	781.08	do.	13.56	Do.
		do.	1,475.00	778.86	do.	13.56	Do.
		do.	1,496.00	590.18	do.	17.50	Do.
		do.	1,525.94	784.06	do.	13.56	Do.
		do.	2,058.00	790.61	do.	13.56	Do.
		do.	2,008.00	703.13	do.		Do.
		do.	1,902.00	613.63	Fair.		Do.
		do.	1,891.00	631.28	do.		Do.
		do.	1,656.00	620.54	do.		Do.
		do.	1,661.00	612.84	Good.	47.35	Do.
		do.	1,697.00	622.30	do.	49.83	Do.
		do.	1,653.00	660.09	do.	66.12	Do.
		do.	1,639.00	566.06	do.	13.56	Do.

TABLE 3.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 463	Barge (100 tons)	36.00	100	0	20	0	4	7	1913	Milan, Ill
No. 464	....do	36.00	100	0	20	0	4	7	1913	....do
No. 465	....do	36.00	100	0	20	0	4	7	1913	....do
No. 466	....do	36.00	100	0	20	0	4	7	1913	....do
No. 467	....do	36.00	100	0	20	0	4	7	1913	....do
No. 468	....do	36.00	100	0	20	0	4	7	1913	....do
No. 469	....do	36.00	100	0	20	0	4	7	1913	....do
No. 470	....do	36.00	100	0	20	0	4	7	1913	....do
No. 471	....do	36.00	100	0	20	0	4	7	1914	....do
No. 472	....do	36.00	100	0	20	0	4	7	1914	....do
No. 477	Barge (150-ton)	51.00	110	0	24	0	5	0	1912	Keokuk, Iowa
No. 478	....do	51.00	110	0	24	0	5	0	1912	....do
No. 479	....do	51.00	110	0	24	0	5	0	1912	....do
No. 480	....do	51.00	110	0	24	0	5	0	1912	....do
No. 481	....do	51.00	110	0	24	0	5	0	1912	....do
No. 482	....do	51.00	110	0	24	0	5	0	1912	....do
No. 483	....do	51.00	110	0	24	0	5	0	1913	....do
No. 484	....do	51.00	110	0	24	0	5	0	1913	....do
No. 485	....do	51.00	110	0	24	0	5	0	1913	....do
No. 507	Barge (30-ton)	8.00	50	0	14	0	3	0	1913	Milan, Ill
No. 508	....do	8.00	50	0	14	0	3	0	1913	....do
No. 509	....do	8.00	50	0	14	0	3	0	1913	....do
No. 510	Tank barge	10.00	60	0	20	0	3	0	1913	South Stillwater, Minn.
No. 515	Flat	6.00	30	0	8	0	2	3	1914	Fountain City, Wis.
No. 516	....do	6.00	30	0	8	0	2	3	1914	....do
No. 517	....do	6.00	30	0	8	0	2	3	1914	Milan, Ill
No. 518	....do	6.00	30	0	8	0	2	3	1914	....do
No. 519	....do	6.00	30	0	8	0	2	3	1914	....do
No. 520	....do	6.00	30	0	8	0	2	3	1914	Keokuk, Iowa
No. 521	....do	6.00	30	0	8	0	2	3	1914	....do
No. 1, U. S. E	Barge (80-ton)	23.00	68	0	16	0	3	8	1908	Rock Falls, Ill
No. 2, U. S. E	....do	23.00	68	0	16	0	3	8	1908	....do
No. 3, U. S. E	....do	23.00	68	0	16	0	3	8	1908	....do
No. 4, U. S. E	....do	25.00	70	0	16	0	4	0	1908	....do
No. 5, U. S. E	....do	25.00	70	0	16	0	4	0	1908	....do
No. 6, U. S. E	....do	25.00	70	0	16	0	4	0	1908	....do
No. 7, U. S. E	....do	25.00	70	0	16	0	4	0	1908	....do
No. 8, U. S. E	....do	25.00	70	0	16	0	4	0	1908	....do
No. 9, U. S. E	....do	25.00	70	0	16	0	4	0	1908	....do
No. 10, U. S. E	....do	25.00	70	0	16	0	4	0	1908	....do
No. 11, U. S. E	....do	25.00	70	0	16	0	4	0	1908	....do
No. 12, U. S. E	....do	25.00	70	0	16	0	4	0	1908	....do
No. 14, U. S. E[1]	House boat		70	0	16	0	4	0	1908	....do
No. 16, U. S. E	Barge[2]									
No. 17, U. S. E	Barge (80-ton)	25.00	70	0	16	0	4	0	1909	Milan, Ill
No. 18, U. S. E	....do	25.00	70	0	16	0	4	0	1909	....do
No. 19, U. S. E	....do	25.00	70	0	16	0	4	0	1909	....do
No. 20, U. S. E	....do	25.00	70	0	16	0	4	0	1909	....do
No. 21, U. S. E	....do	25.00	70	0	16	0	4	0	1909	....do
No. 22, U. S. E	....do	25.00	70	0	16	0	4	0	1909	....do
No. 23, U. S. E	....do	25.00	70	0	16	0	4	0	1909	....do
No. 24, U. S. E	....do	25.00	70	0	16	0	4	0	1909	....do
No. 25, U. S. E	House boat		60	0	16	0	3	0	1910	....do
No. 26, U. S. E	Barge (80-ton)	25.00	70	0	16	0	4	0	1911	....do
No. 27, U. S. E	....do	25.00	70	0	16	0	4	0	1911	....do
No. 28, U. S. E	....do	25.00	70	0	16	0	4	0	1911	....do
No. 29, U. S. E	....do	25.00	70	0	16	0	4	0	1911	....do
No. 30, U. S. E	Excavator		59	3	30	0	4	0	1914	....do
No number	Rowboat (Rock Falls)		18	0	3	5	1	3		Muskegon, Mich
Do	Rowboat (Marion)		15	6	3	4	1	4		Illinois River
Do	Lifeboat (Ellen)		15	5	4	6	1	10	1907	Grafton, Ill
Do	....do		15	5	4	6	1	10	1907	....do
Do	Lifeboat (Muscatine)		18	0	5	5	2	4	1915	....do

---

[1] Formerly X.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$1,652.00	$541.49	Good..		Mississippi River, Missouri River to Minneapolis.
		...do...	1,679.00	568.02	...do...	$13.56	Do.
		...do...	1,818.00	910.29	...do...	62.32	Do.
		...do...	1,666.00	763.32	...do...	115.48	Do.
		...do...	1,603.00	707.00	...do...	14.00	Do.
		...do...	1,673.00	751.26	...do...		Do.
		...do...	1,706.00	698.90	...do...		Do.
		...do...	1,647.00	675.11	...do...		Do.
		...do...	1,677.00	691.93	...do...		Do.
		...do...	1,812.00	788.88	...do...	62.09	Do.
		...do...	2,352.00	770.46	...do...		Do.
		...do...	2,301.00	754.07	...do...		Do.
		...do...	2,234.00	736.05	...do...		Do.
		...do...	2,246.00	731.95	...do...		Do.
		...do...	2,173.00	721.66	...do...		Do.
		...do...	2,134.00	699.18	...do...		Do.
		...do...	2,144.00	615.82	...do...		Do.
		...do...	1,999.00	654.95	...do...		Do.
		...do...	1,961.00	650.15	...do...	1.31	Do.
		...do...	421.00	173.30	...do...	44.09	Do.
		...do...	409.00	146.18	...do...		Do.
		...do...	435.00	173.26	...do...	10.37	Do.
		...do...	785.00	259.63	...do...	3.00	Do.
		...do...	150.00	61.44	...do...		Do.
		...do..	150.00	61.44	...do..		Do.
		...do..	197.00	80.68	...do..		Do.
		...do..	171.00	70.26	...do..		Do.
		...do..	167.00	75.28	...do..		Do.
		...do..	150.00	68.62	...do..		Do.
		...do..	150.00	70.30	...do..		Do.
		...do..	550.00	70.91	Poor..		Illinois and Mississippi Canal.
		...do..	550.00	96.31	Fair...		Do.
		...do..	550.00	138.70	Poor..		Do.
		...do..	550.00	205.64	Fair...		Do.
		...do..	550.00	126.70	...do..		Do.
		...do..	550.00	269.52	...do..		Do.
		...do..	550.00	154.54	...do..		Do.
		...do..	550.00	143.43	...do..		Do.
		...do..	550.00	234.69	...do..	40.22	Do.
		...do..	550.00	164.12	Poor..		Do.
		...do..	550.00	265.17	Fair...		Do.
		...do..	550.00	296.64	...do..	162.83	Do.
		...do..	550.00	136.86	Poor..		Do.
							Do.
		Wood.	838.00	251.42	Fair...		Do.
		...do..	838.00	251.38	...do..		Do.
		...do..	838.00	254.68	...do..		Do.
		...do..	838.00	285.85	...do..	28.75	Do.
		...do..	838.00	294.51	...do..	35.68	Do.
		...do..	838.00	250.71	...do..		Do.
		...do..	838.00	249.84	...do..		Do.
		...do..	838.00	264.22	...do..		Do.
		...do..	1,425.00	442.37	...do..		Do.
		...do..	1,119.00	349.73	...do..		Do.
		...do..	1,080.00	367.32	...do..		Do.
		...do..	1,130.00	357.45	...do..		Do.
		...do..	1,137.00	353.51	...do..		Do.
		Steel and fir.	11,908.34	4,879.95	...do..		Do.
1904	Muskegon, Mich.	Wood.	70.00	3.20	Bad...		Do.
		Metal.			Fair...		Do.
1907	Grafton, Ill.	Iron...			..do..		Mississippi River, Missouri River to Minneapolis.
1907	.....do.	...do..			..do..		Do.
1915	.....do.	...do..	78.00	49.92	Good.		Do

[2] Condemned 1917. Sunk and lost in deep water in Rock Island rapids.

TABLE 3.—*Statement of floating plant owned by the United States and*

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No number	Lifeboat (Muscatine)		18	0	5	5	2	4	1915	Grafton, Ill
Do	Lifeboat (Le Claire)		18	0	5	5	2	4	1915	do
Do	do		18	0	5	5	2	4	1915	do
Do	Lifeboat (Nauvoo)		18	0	5	5	2	4	1915	do
Do	do		18	0	5	5	2	4	1915	do
Do	Lifeboat (Minneapolis)		18	0	5	5	2	4	1915	do
Do	do		18	0	5	5	2	4	1915	do
Do	Lifeboat (Snagboat)		15	7	3	7	1	6	1907	Salem, Ohio
Do	Lifeboat (Alert)		17	10	4	6	1	1	1915	Fountain City, Wis
Do	do		17	9	3	8	1	1		
Do	Lifeboat (Coal Bluff)		17	0	4	8	1	2		
Do	do		17	0	4	8	1	2		
Do	Lifeboat (Elinor		16	0	5	0	2	0	1915	Grafton, Ill
Do	Yawl (Snagboat)		23	8	5	4	2	0	1909	St. Louis, Mo
Do	Yawl (Milan)		26	0	5	6	1	4	1909	Keokuk, Iowa
Do	Skiff (Fury)		16	0	4	0	1	4	1904	Grafton, Ill
Do	Skiff (Davenport)		20	6	4	9	1	4	1912	Stillwater, Minn
Do	do		22	0	4	10	1	9	1913	do
Do	Skiff (Ellen)		16	2	4	0	1	2		
Do	Skiff (Apache)		21	10	5	0	1	5		
Do	do		21	10	5	0	1	5		
Do	Skiff (Silver Lake)		20	0	4	6	1	0	1910	Milan boat yard
Do	Skiff (Lock 30)		18	0	4	0	1	0	1915	do
Do	Skiff (Lock 31)		18	0	4	0	1	0	1915	do
Do	Skiff (Lock 32)		18	0	4	0	1	0	1915	do
Do	Skiff (Apo)		19	0	5	0	1	4		
Do	do		26	0	5	4	1	6	1914	Milan boat yard
Do	Skiff (Etna)		20	0	5	2	1	3		
Do	do		22	4	5	0	1	8		
Do	Skiff (Geyser)		22	4	5	0	2	2		Milan boat yard
Do	do		21	7	4	6	2	0		Not known
Do	Skiff (Mayon)		26	0	5	6	1	4		Milan boat yard
Do	Skiff (Pelee)		16	0	3	6	1	1		
Do	do		16	0	3	6	1	1		
Do	do		24	0	4	8	1	3		
Do	Skiff (Vesuvius)		23	4	4	6	1	6	1909	Fountain City, Wis
Do	do		22	6	4	6	1	6	1913	do
Do	Skiff (Taal)		21	9	4	8	1	5	1916	do
Do	do		18	0	4	0	1	5	1916	do
Do	Skiff (Hecla)		24	0	5	2	1	3		
Do	do		24	0	5	2	1	3	1911	Milan boat yard
Do	Skiff (Vulcan)		26	0	5	6	1	4		do
Do	Skiff (Ajax)		22	0	5	0	1	2	1910	do
Do	do		16	0	3	10	1	1½	1915	
Do	Skiff (Keokuk)		22	0	4	6	1	6	1914	Moline, Ill
Do	Skiff (St. Paul)		22	0	5	0	1	4	1910	Milan, Ill
Do	Skiff (drillboat 426)		26	0	5	2	1	8	1913	Moline, Ill
Do	do		22	0	4	6	1	7	1913	Milan, Ill
Do	do		18	0	4	1	1	6	1913	do

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1915	Grafton, Ill.	Iron	$78.00	$49.92	Good		Mississippi River, Missouri River to Minneapolis.
1915	do	do	78.00	55.52	do	$7.00	Do.
1915	do	do	78.00	56.52	do	8.25	Do.
1915	do	do	78.00	49.92	do		Do.
1915	do	do	78.00	49.92	do		Do.
1915	do	do	78.00	49.92	do		Do.
1915	do	do	78.00	49.92	do		Do.
1907	Salem, Ohio	do	42.00	9.60	Bad		Operating snagboats and dredge boats on Mississippi River.
		Wood	40.00	25.68	Good		Mississippi River, Missouri River to Minneapolis.
		do			Bad		Do.
		Metal			Fair		Do.
		do			do		Do.
1915	Grafton, Ill.	Iron	65.00	41.81	Good	12.26	Do.
1909	St. Louis, Mo.	Wood	202.00	19.20	Bad		Operating snagboats and dredge boats on Mississippi River.
		do	75.00	16.00	Fair		Mississippi River, Missouri River to Minneapolis.
1904	Grafton, Ill.	Steel	35.00		do		Do.
1912	Stillwater, Minn	Wood	40.00		Good		Do.
1913	Lake City, Minn	do	65.00		Fair		Do.
		do			do		Do.
		do			Good		Do.
		do			do		Do.
		do	60.00	19.20	Fair		Do.
		do	40.00	19.20	Good		Illinois and Mississippi Canal.
		do	40.00	19.20	do		Do.
		do	40.00	19.20	do		Do.
1912	Grafton, Ill.	Sheet steel.	50.00	24.00	do		Mississippi River, Missouri River to Minneapolis.
		Wood	75.00	46.00	do		Do.
1912	Grafton, Ill.	Sheet steel.			Fair		Do.
1912	do	Wood			Good		Do.
		do		32.03	Fair	16.04	Do.
		do		32.03	do	16.04	Do.
		do	75.00	46.00	Good		Do.
1913	Stillwater, Minn	do	36.00	30.39	Fair	13.29	Do.
1913	do	do	33.50	33.67	Good	13.29	Do.
1915	do	do	48.00	41.35	do	13.29	Do.
		do	61.74	39.35	do	17.19	Do.
		do	60.00	39.35	do	17.19	Do.
		do	61.50	49.40	do		Do.
		do	61.50	49.40	do		Do.
1911	Grafton, Ill.	Sheet steel.	75.00	38.40	do		Do.
		Wood	75.00	38.40	do		Do.
		do	75.00	40.00	Fair	8.00	Do.
		do	70.00	59.00	do	10.00	Do.
		Metal	70.00	54.00	do	10.00	Do.
		Wood	70.00	40.00	Good		Do.
		do	70.00	25.00	Fair	30.00	Do.
		do	90.00	64.00	Good	20.00	Do.
		do	70.00	60.80	do	20.00	Do.
		do	70.00	57.60	do	20.00	Do.

TABLE 3.—*Statement of floating plant owned by the United States and*

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
SAN FRANCISCO, GAL., FIRST DISTRICT.							
			Ft.in.	*Ft.in.*	*Ft.in.*		
San Pablo	Seagoing hopper dredge.	1,100.00	163 6	35 0	17 0	1914 1916	Baltimore, Md
Suisun	Gasoline launch (screw).	73.00	85 9	16 6	10 5	1913 1914	Astoria, Oreg.
Clyde	Gasoline launch	9.00	42 0	9 8	4 0		
Suisun No. 3	Dinghy		16 0			1913	San Francisco, Cal.
	Yawl		16 0			1914	Oakland, Cal.
Suisun No. 1	Gasoline launch (screw).		16 0			1914	Mare Island Navy Yard, Cal.
Susisun No. 2	Life boat		14 0			1914	do
Dora	Gasoline launch		24 0	5 0	1 6		
SAN FRANCISCO, CAL., THIRD DISTRICT.							
Rio Vista	Motor dredge tender	45.50	60 0	16 0	7 0	1913	Sacramento, Cal.
Seizer	Stern-wheel snabgoat	240.00	157 7	35 0	4 8	1881	Stockton, Cal.
Sacramento	Hydraulic pipe-line dredge.	984.00	150 0	40 0	11 6	1913	Baltimore, Md., and Pittsburg, Cal.
San Joaquin	do	984.00	150 0	40 0	11 6	1913	do
Tackle	Pile driver	58.00	64 0	28 0	3 6	1907	Oakland, Cal.
Kern	Gasoline launch	3.7	30 0	6 10	3 2		
Clyde	do	9.0	42 0	9 8	4 0	1904	Fairhaven, Cal.
SAVANNAH, GA.							
Cumberland	Seagoing hopper dredge	1,905.00	200 0	41 0	23 6	1902	Belfast, Me.
Savannah	do	1,461.00	177 0	38 0	19 0	1904	Sparrows Point, Md.
Caucus	do	1,980.00	200 0	41 0	23 2	1905	Greenpoint, L. I.

[1] Delivered at San Francisco.
[2] None (while in possession of this district).

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

SAN FRANCISCO, CAL., FIRST DISTRICT.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
		Steel.	[1]$240,000.00	$300,000.00	First class.	$5,383.41	Project for keeping open channel across Pinole Shoal, San Pablo Bay, Cal.
		Wood.	35,000.00	35,000.00	do.	1,883.68	Used for patrolling San Fancisco Bay and tributaries.
1911	Eureka, Cal.	do.	500.00	4,000.00	do.		Now under lease to third San Francisco, district.
		do.	192.50	192.50	do.		Used as life boat on cruiser Suisun.
		do.	73.00	73.00	do.		Used on surveys and inspecting dredging, Oakland Harbor, Cal.
		do.	840.00	840.00	do.		Do.
		do.	77.46	77.46	do.		Used as life boat on cruiser Suisun.
1917	Eureka, Cal.	do.	100.00	100.00	do.		Used by caretakers at North and South Jetties, Eureka, Cal.

SAN FRANCISCO, CAL., THIRD DISTRICT.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
		Wood.	$9,200.00	$8,000.00	Good.	$411.55	Flood control, Sacramento River, Cal.
		do.	35,000.00	7,500.00	Poor.	1,384.57	Improving Sacramento and Feather Rivers, Cal. (general improvement); San Joaquin River, Cal. (maintenance).
		Steel.	176,800.00	140,000.00	Good.	9,316.06	Flood control, Sacramento River, Cal.
		do.	176,800.00	140,000.00	do.	10,654.90	Do.
		Wood.	6,525.62	1,800.00	Fair.	670.42	Improving Sacramento and Feather Rivers, Cal. (general improvement), and flood control, Sacramento River, Cal.
1917	Hull, Mare Island Navy Yard. Engine, San Francisco.	do.	1,635.00	1,635.00	Good.		Flood control, Sacramento River, Cal.
1911	Eureka, Cal.	do.	500.00	3,000.00	do.	(3)	Belongs to first San Francisco, Cal., engineer district, but rented temporarily to third San Francisco district since Dec. 7, 1917.

SAVANNAH, GA.

Purchased. When.	Purchased. Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
		Wood.	[3]$144,750.00	$85,000.00	Good.	$3,340.91	Improving Savannah Harbor, Ga.
		Steel.	175,500.00	90,000.00	do.	25,637.87	Improving Savannah Harbor, Ga., and Brunswick Harbor, Ga.
1905	Greenpoint, L. I.	Wood.	150,000.00	85,000.00	do.	0.00	Improving Brunswick Harbor, Ga.

[3] $23,423.92 to be added to contract price for sheathing bottom with copper.

TABLE 3.—*Statement of floating plant owned by the United States and*

SAVANNAH, GA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Morgan	Hydraulic pipe-line dredge.	757.00	134	5	38	0	8	0	1907	Baltimore, Md
Creighton	do	221.00	80	0	30	0	6	0	1915	Charleston, S. C.
Macon	do	120.00	74	0	28	0	4	6	1911	Jacksonville, Fla.
Augusta	do	140.00	74	0	28	0	4	6	1911	do
Tugaloo [1]	Stern-wheel snagboat	384.00	129	3	34	0	5	6	1902	Savannah, Ga.
Oconee [2]	do	136.00	126	0	28	0	4	6	1897	Macon, Ga.
Snagboat No. 1	Nonpropelling snagboat.	35.00	54	0	18	0	4	0	1914	Waycross, Ga
Sapelo [3]	Derrick boat	160.00	85	4	29	8	5	5	1894	Savannah, Ga.
Angler	Steam launch	95.00	91	0	17	2	10	0	1905	Charleston, S. C.
Gibbon	Steam tug	124.00	73	6	19	0	9	0	1897	do
Gem [4]	Steam survey boat	11.00	45	2	9	3	4	6	1891	Savannah, Ga.
Brunswick	Kerosene tug	43.00	60	0	15	0	6	0	1915	Charleston, S. C.
Spray	Kerosene launch	12.00	45	6	11	0	7	6	1908	Morris Heights, N. Y.
Seneca [5]	do	7.30	40	0	8	0	2	9	1891	New York, N. Y
Amelia	Gasoline launch	4.50	35	0	9	0	5	9	1901	Long Island, N. Y
Cosine	do	4.00	25	0	6	6	2	6	1903	Baltimore, Md
Cockspur	do	1.10	20	0	6	0	2	9	1914	Jacksonville, Fla
Pulaski	do	2.08	22	0	7	0	2	9	1914	do
Uchee	do	1.50	24	0	5	11	2	4	1914	do
No. 1	Deck lighter	30.00	56	0	15	4	3	0	1910	Macon Ga.
No. 2	do	30.00	65	0	20	0	4	6	1915	Doctortown, Ga.
No. 3	do	34.00	45	0	20	0	3	11	1913	Savannah, Ga.
No. 4	do	30.00	65	0	20	0	4	6	1915	Doctortown, Ga.
No. 5 [6]	do	15.00	51	7	12	0	3	6	1914	Savannah, Ga.
No. 1	Coal lighter	61.00	80	0	22	0	7	6	1908	do
No. 2	do	19.60	47	0	16	0	4	0	1915	Charleston, S. C.
No. 3	do	52.45	65	0	22	0	6	0	1915	do
No. 1 [7]	Pile driver	14.00	44	6	16	8	3	6	1910	Macon, Ga.

[1] New hull built 1908 and new machinery installed in 1910.
[2] New hull built in 1908 and new machinery installed in 1913.
[3] New hull built in 1901 and 1917, new machinery 1907 and 1910.
[4] Rebuilt in 1911-12.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

SAVANNAH, GA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Steel..	$119,676.21	$120,000.00	Good..	$35,587.79	Improving Savannah Harbor, Ga.
		...do...	39,389.86	35,000.00	...do...	4,408.43	Improving Savannah Harbor, Darien Harbor, Ga., and waterway Savannah, Ga., to Fernandina, Fla.
		...do...	17,875.00	14,000.00	...do...	392.77	Improving Ocmulgee River, Ga.
		...do...	17,875.00	17,000.00	...do...	255.68	Improving Savannah Harbor and channel Savannah, Ga., to Beaufort, S. C.
		Wood.	25,000.00	11,500.00	...do...	191.61	Improving Savannah Harbor, Ga., and Savannah River below Augusta, Ga.
		...do...	3,750.00	5,000.00	...do...	177.22	Improving Ocmulgee and Oconee Rivers, Ga.
		...do...	2,380.25	1,000.00	Fair...	296.25	Improving Darien Harbor, Ga., and waterway Savannah, Ga., to Fernandina, Fla.
		...do...	12,000.00	16,000.00	Good..	16,044.10	Improving Altamaha, Ocmulgee, and Oconee Rivers, Ga.
1905	Charleston, S. C.	...do...	12,000.00	7,500.00	...do...	860.99	Improving Savannah Harbor, Ga.
		...do...	Unknown	10,000.00	...do...	3,476.60	Do.
		...do...	4,000.00	3,000.00	...do...	936.88	Do.
		Steel..	13,701.00	10,000.00	...do...	1,155.83	Improving Savannah Harbor, Ga., Darien Harbor, Ga., and waterway, Savannah, Ga., to Fernandina, Fla.
1909	New York, N. Y.	Wood.	4,800.00	3,200.00	...do...	638.46	Improving Savannah Harbor. Ga.
1902	.....do.....	...do...	1,500.00	200.00	Condemned	.60	Do.
1901	Long Island, N.Y	...do...	2,500.00	1,500.00	Good..	292.23	Improving Brunswick Harbor, Ga.
1903	Baltimore, Md..	...do...	350.00	200.00	...do...	117.92	Do.
1914	Jacksonville, Fla	...do...	399.00	225.00	...do...		Improving Savannah Harbor, Ga.
1914	.....do.....	...do...	550.00	400.00	...do...		Do.
1915	Brunswick, Ga..	Steel..	381.00	200.00	Fair...		Improving Savannah River at and below Augusta, Ga.
		Wood.	600.00	250.00	...do...		Improving Altamaha River system.
		...do...	1,359.73	900.00	Good..		Do.
		...do...	520.00	350.00	...do...		Improving Savannah Harbor, Ga.
		...do...	1,359.74	900.00	...do...		Improving Altamaha River system.
		...do...	800.00	600.00	...do...	437.13	Improving Savannah Harbor, Ga.
		...do...	3,000.00	1,800.00	...do...	33.15	Improving Savannah Harbor, Ga., and waterway Savannah, Ga., to Fernandina, Fla.
		Steel..	2,876.00	2,000.00	...do...	369.11	Do.
		...do...	4,743.00	4,000.00	...do...		Improving Savannah Harbor, Ga.
		Wood.	1,500.00	500.00	Fair...		Improving Altamaha River system.

[5] Old Gem remodeled and motor out of old Skidaway installed; hull condemned 1917.
[6] Quarter boat No. 2 converted into barge No. 5 in 1917.
[7] Hull rebuilt 1915.

TABLE 3.—*Statement of floating plant owned by the United States and*

SAVANNAH, GA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Material T. B.	Material testing barge	36.00	45 0	20 0	4 8	1914	Savannah, Ga.
No. 2	Derrick lighter	7.00	24 0	14 0	2 8	1915	do.
No. 3[1]	do.	43.30	65 0	22 0	5 0	1915	Charleston, S. C.
No. 1[2]	Quarter boat	27.00	51 6	11 0	4 0	1907	Brunswick, Ga.
No. 3	do.	30.00	56 0	15 4	3 0	1910	Macon, Ga.
No. 4	do.	15.00	51 0	13 0	4 0	1913	Brunswick, Ga.
No. 5	do.	20.00	41 0	16 0	3 10	1914	Augusta, Ga.
No. 6[3]	do.	42.00	60 0	20 0	6 0	1908	Savannah, Ga.

SEATTLE, WASH.

Name or number.	Type.	Displacement in long tons.	Length.	Beam.	Depth.	When.	Where.
Swinomish	Snagboat, combination with dredge bucket.	275.00	138 0	32 0	5 6	1914-5	Winslow, Wash.
Wilson	Steam tug	106.00	94 0	19 6	11 0	1899	Detroit, Mich.
Orcas	Gasoline launch, screw	45.00	70 6	14 0	3 7	1913	Winslow, Wash.
Kettle Falls	Paddle-wheel gas launch.	18.00	50 0	12 0		1913-4	Puget Sound Navy Yard.
Columbia River No. 1.	Drill scow	100.00	100 0	26 6	4 6	1911	Wenatchee, Wash.
Columbia River No. 2.	do.	100.00	100 0	26 6	4 6	1911	do.
Columbia River No. 3.	do.	100.00	100 0	26 6	4 6	1911	do.
No name	Deck scow		80 0	26 0	8 0		Unknown.
No. 1	do.		100 0	32 0	8 9	1899	Seattle, Wash.
No. 2	do.		100 0	32 0	8 9	1899	do.
No. 5	do.		100 0	32 0	8 9		Port Blakely, Wash.
No. 6	do.		100 0	32 0	8 9		do.

ST. LOUIS, MO.

Name or number.	Type.	Displacement in long tons.	Length.	Beam.	Depth.	When.	Where.
Selma[4]	Hydraulic dredge	600.00	160 0	40 6	0 0	1898	Jeffersonville, Ind.
Thebes[5]	do.	600.00	160 0	40 0	6 0	1898	do.
Fort Gage[6]	do.	815.00	197 0	45 0	7 6	1908	Dubuque, Iowa.
Fort Chartres[7]	do.	815.00	197 0	45 0	7 6	1908	do.
Phoenix[8]	Dipper dredge	240.00	80 0	30 0	8 0	1909	Milan, Ill.
Vulcan[8]	do.	240.00	80 0	30 0	8 0	1883	Davenport, Iowa.
Macomb, J. N.	Snagboat	1,160.00	177 6	62 0	8 0	1874	Cincinnati, Ohio.
Wright, H. G.	do.	1,200.00	190 6	62 0	8 0	1880	St. Louis, Mo.

[1] New hoisting engine purchased and installed December, 1915.
[2] Hull of Skidaway converted into quarter boat.
[3] Derrick lighter No. 1 converted into quarter boat No. 6 in 1915.
[4] Formerly No. 3.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

SAVANNAH, GA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$2,656.00	$1,500.00	Good..		Improving Savannah Harbor, Ga.
		..do...	260.00	200.00	..do...		Improving Savannah Harbor, Ga., and waterway Savannah, Ga., to Fernandina, Fla.
		Steel..	5,505.00	5,000.00	..do...	$14.58	Improving Savannah Harbor, Ga.
		Wood.	1,400.00	25.00	Poor..		Do.
		..do...	600.00	150.00	..do...		Improving Altamaha, Oconee, and Ocmulgee Rivers, Ga.
		..do...	507.00	500.00	Good..	484.90	Improving Brunswick Harbor, Ga.
		..do...	919.00	500.00	..do...	361.99	Improving Savannah Harbor, Ga.
		..do...	1,800.00	700.00	..do...		Do.

SEATTLE, WASH.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
		Wood.	$48,225.00	$48,225.00	Good..		Puget Sound, Wash.
		Steel..	37,000.00	30,000.00	..do...		River and harbor and fortification work.
		Wood.	29,500.00	29,500.00	..do...		River and harbor works.
		..do...	8,800.00	6,500.00	..do...		Improving Columbia River between Bridgeport and Kettle Falls.
		..do...	12,000.00	6,000.00	Fair...		Do.
		..do...	12,000.00	6,000.00	..do...		Do.
		..do...	12,000.00	6,000.00	..do...		Do.
		..do...	750.00	700.00	..do...		Improving Grays Harbor, Wash.
		..do...	2,970.00	1,800.00	..do...		Gun and mortar battteries.
		..do...	2,970.00	1,800.00	..do...		Do.
1913	Seattle, Wash...	..do...	4,450.00	3,000.00	..do...		Waterway connecting Puget Sound with Lakes Union and Washington (entrance to Salmon Bay).
1913	Seattle, Wash...	..do...	4,450.00	3,000.00	..do...		Do.

ST. LOUIS, MO.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
		Steel..	$117,151.06	$50,000.00	Good..	$252.02	Mississippi River between mouths of Ohio and Missouri Rivers.
		..do...	114,574.95	50,000.00	..do...	10,988.18	Do.
		..do...	177,978.98	110,000.00	..do...	9,033.96	Do.
		..do...	176,795.56	110,000.00	..do...	9,738.78	Do.
1916	Rock Island, Ill., district.	Wood.	19,525.00	1,000.00	Poor..	1,543.59	Do.
1916	.....do	..do...	19,450.00	500.00	Unserviceable.	760.70	Do.
		Steel..	240,000.00	49,000.00	Good..	1,005.07	Removing obstructions in Mississippi, Atchafalaya, and Old Rivers.
		..do...	190,000.00	55,500.00	..do...	1,452.87	Do.

---

[5] Formerly No. 4.
[6] Formerly No. 5
[7] Formerly No. 6.
[8] Purchased from Rock Island, Ill., district, November, 1916.

TABLE 3.—*Statement of floating plant owned by the United States and*

ST. LOUIS, MO.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Simpson, Gen. J. H.	Towboat	525.00	196	0	32	0	5	0	1895	Jeffersonville, Ind.
King, Wm. R.	do	716.00	218	10	41	0	5	3	1899	do
Isle de Bois [1]	Steam tender	50.00	64	8	18	6	3	6	1894	do
Aux Vases [2]	do	50.00	84	8	18	6	3	6	1894	do
Salvisi [3]	do	150.00	118	3	25	0	4	3	1900	do
Kaskaskia [4]	do	150.00	118	3	25	0	4	3	1900	do
Meramec [5]	do	150.00	118	3	25	0	4	3	1900	do
Birch	Gasoline launch (screw)	1.5	28	0	6	6	2	6	1909	Grafton, Ill
Stewart	do	1.5	28	0	6	6	2	2	1909	do
No. 1	Pile driver	75.00	68	0	20	0	3	1¼	1894	Cincinnati, Ohio
No. 3	do	75.00	68	0	20	0	3	1¼	1894	do
No. 5	do	75.00	68	0	20	0	3	1¼	1894	do
No. 26	do	75.00	68	0	20	0	3	1¼	1893	St. Louis, Mo
No. 28	do	75.00	68	0	20	0	3	1¼	1893	do
No. 29	do	75.00	68	0	20	0	3	1¼	1893	do
No. 30	do	75.00	68	0	20	0	3	1¼	1893	do
No. 31	do	75.00	68	0	20	0	3	1¼	1893	do
No. 32	do	75.00	68	0	20	0	3	1¼	1893	do
No. 33	do	75.00	68	0	20	0	3	1¼	1893	do
No. 35	do	75.00	68	0	20	0	3	1¼	1893	do
No. 101	do	106.00	88	0	25	0	4	6	1913	Ambridge, Pa
No. 102	do	106.00	88	0	25	0	4	6	1913	do
No. 103	do	106.00	88	0	25	0	4	6	1913	do
No. 104	do	106.00	88	0	25	0	4	6	1913	do
No. 101	Grader and derrick boat	126.00	88	0	25	0	4	6	1913	do
No. 102	do	126.00	88	0	25	0	4	6	1913	do
No. 1	Derrick boat	75.00	68	0	20	0	3	1¼	1893	St. Louis, Mo
No. 2	do	75.00	68	0	20	0	3	1¼	1893	do
No. 1	Quarter boat	130.00	135	0	32	0	3	11	1893	Cincinnati, Ohio
No. 4	do	130.00	135	0	32	0	3	11	1893	do
No. 7	do	130.00	135	0	32	0	3	11	1893	Jeffersonville, Ind.
No. 8	do	130.00	135	0	32	0	3	11	1893	do
No. 9	do	130.00	135	0	32	0	3	11	1893	do
No. 10	do	130.00	135	0	32	0	3	11	1893	do
No. 1	Office and survey boat	115.00	135	0	28	0	3	6	1893	Dubuque, Iowa
No. 2	do	115.00	135	0	28	0	3	6	1893	do
No. 3	do	115.00	135	0	28	0	3	6	1893	do
No. 4	do	115.00	135	0	28	0	3	6	1893	Jeffersonville, Ind.
No. 5	do	70.00	120	0	24	0	5	0	1893	Gasconade, Mo
No. 117	Barge, model	425.00	135	0	28	0	5	0	1893	Paducah, Ky
No. 118	do	425.00	135	0	28	0	5	0	1893	do
No. 119	do	425.00	135	0	28	0	5	0	1893	do
No. 127	do	425.00	135	0	28	0	5	0	1884	Madison, Ind
No. 129	do	425.00	135	0	28	0	5	0	1894	do
No. 130	do	425.00	135	0	28	0	5	0	1894	do
No. 136	do	425.00	135	0	28	0	5	0	1894	Jeffersonville, Ind.
No. 205	Barge, model (store boat)	425.00	135	0	28	0	5	0	1894	Madison, Ind

---

[1] Formerly No. 6.
[2] Formerly No. 7.
[3] Formerly No. 8.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ST. LOUIS, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$40,000.00	$5,000.00	Unserviceable.	$1,095.35	Mississippi River between mouths of Ohio and Missouri Rivers.
		Steel..	72,000.00	38,200.00	Dismantled.	25,604.86	Do.
		Wood.	4,400.00	700.00	Unserviceable.		Do.
		..do...	4,400.00	700.00	...do...	2.36	Do.
		Steel..	19,279.50	6,800.00	Good..	300.44	Do.
		..do...	19,279.50	6,800.00	...do...	1,992.56	Do.
		..do...	19,279.50	7,600.00	...do...	790.99	Do.
		..do...	519.00	300.00	...do...		Removing obstructions in Mississippi, Atchafalaya, and Old Rivers.
		..do...	519.00	300.00	...do...		Do.
		Wood.	4,500.00	1,450.00	Fair...	16.30	Do.
		..do..	4,500.00	1,450.00	...do...		Do.
		..do...	4,500.00	1,500.00	...do...		Do.
		..do...	3,590.00	1,450.00	...do...		Do.
		..do...	3,590.00	1,450.00	...do...		Do.
		..do...	3,590.00	1,450.00	...do...	87.93	Do.
		..do...	3,590.00	1,450.00	...do...	7.60	Do.
		..do...	3,590.00	1,450.00	...do...	45.34	Do.
		..do...	3,590.00	1,450.00	...do...		Do.
		..do...	3,590.00	1,450.00	...do...	165.60	Do.
		..do...	3,590.00	1,450.00	...do...		Do.
		Steel..	8,722.44	6,200.00	Good..	33.25	Mississippi River between mouths of Ohio and Missouri Rivers.
		..do...	8,722.44	6,200.00	...do...		Do.
		..do...	8,722.44	6,200.00	...do...	139.31	Do.
		..do...	8,722.44	6,200.00	...do...	21.60	Do.
		..do...	13,690.02	10,200.00	...do...	100.89	Do.
		..do...	13,690.02	10,200.00	...do...		Do.
		Wood.	4,000.00	1,450.00	Fair...	146.88	Do.
		..do...	4,000.00	1,450.00	...do...	96.41	Do.
		..do...	5,200.00	1,700.00	Good..	241.48	Do.
		..do...	5,200.00	1,700.00	...do...	437.50	Do.
		..do...	5,390.00	500.00	Unserviceable.		Do.
		..do...	5,390.00	1,700.00	Good..	491.61	Do.
		..do...	5,390.00	1,700.00	...do...	321.04	Do.
		..do...	5,390.00	1,700.00	...do...	105.74	Do.
		..do...	4,400.00	400.00	Unserviceable.		Do.
		..do...	4,400.00	1,600.00	Good..	120.30	Do.
		..do...	4,400.00	1,600.00	...do...	87.06	Do.
		..do...	4,340.00	1,600.00	...do...		Do.
1903	Gasconade, Mo..	..do...	2,000.00	1,800.00	...do...	344.09	Do.
		..do...	3,700.00	50.00	Very poor	41.34	Do.
		..do...	3,700.00	50.00	Unserviceable.	43.03	Do.
		..do...	3,700.00	50.00	Very poor.	143.71	Do.
		..do...	3,590.00	50.00	...do...	65.26	Do.
		..do...	3,590.00	50.00	...do...	209.85	Do.
		..do...	3,590.00	50.00	...do...	59.78	Do.
		..do...	3,650.00	500.00	Fair...	12.28	Do.
		..do...	3,800.00	50.00	Poor..	326.79	Do.

[4] Formerly No. 9.

[5] Formerly No. 10.

TABLE 3.—*Statement of floating plant owned by the United States and*

ST. LOUIS, MO.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 209	Barge model (store boat).	425.00	135	0	28	0	5	0	1894	Madison, Ind.
No. 213	Barge, model	425.00	135	0	28	0	5	0	1894	Cincinnati, Ohio
No. 218	....do	425.00	135	0	28	0	5	0	1894	....do
No. 4	Barge, flat	240.00	100	0	24	0	5	4	1893	Gasconade, Mo.
No. 1	Barge	650.00	152	0	34	0	6	0	1911	Ambridge, Pa.
No. 2	....do	650.00	152	0	34	0	6	0	1911	....do
No. 3										
No. 4										
No. 5										
No. 6										
No. 7										
No. 8										
No. 9										
No. 10										
No. 11										
No. 12										
No. 13										
No. 14										
No. 15										
No. 16	....do	650.00	152	0	34	0	6	0	1911	....do
No. 17										
No. 18										
No. 19										
No. 20										
No. 21										
No. 22										
No. 23										
No. 24										
No. 25										
No. 1	Machine shop boat	75.00	68	0	20	0	3	1½	1909	St. Louis, Mo
No. 116	Flats	25.00	40	0	16	0	2	6	1900	Leavenworth, Ind.
No. 117										
No. 118										
No. 119										
No. 120										
No. 121										
No. 122										
No. 123										
No. 124										
No. 125										
No. 126										
No. 127										
No. 128										
No. 129										
No. 130										
No. 131										
No. 132										
No. 133										
No. 134										
No. 135										
No. 136										
No. 137										
No. 138										
No. 139										
No. 140										
No. 141										
No. 142										
No. 143										
No. 144										
No. 145										

[1] Each

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ST. LOUIS, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	$3,800.00	$50.00	Unserviceable.	$18.02	Mississippi River between mouths of Ohio and Missouri Rivers.
......	....	...do...	3,597.00	50.00	...do...	71.71	Do.
......	....	...do...	3,597.00	50.00	Very poor.	146.33	Do.
1908	Gasconade, Mo..	...do ..	200.00	75.00	Unserviceable.	48.44	Do.
......	....	Steel..	12,016.56	7,800.00	Good..	....	Do.
......	....	...do...	[1] 11,208.92	7,800.00	...do...	46.10	Do.
				7,800.00	...do...	16.70	
				7,800.00	...do...	41.81	
				7,800.00	...do...	38.01	
				7,800.00	...do...	....	
				7,800.00	...do...	39.03	
				7,800.00	...do...	11.50	
				7,800.00	...do...	45.20	
				7,800.00	...do...	28.18	
				7,800.00	...do...	52.18	
				7,800.00	...do...	....	
				7,800.00	...do...	....	
				7,800.00	...do...	90.32	
				7,800.00	...do...	14.58	
......	....	...do...	[1] 11,425.62	7,800.00	...do...	23.68	Do.
				7,800.00	...do...	8.00	
				7,800.00	...do...	....	
				7,800.00	...do...	14.92	
				7,800.00	...do...	10.40	
				7,800.00	...do...	71.21	
				7,800.00	...do...	31.23	
				7,800.00	...do...	45.90	
				7,800.00	...do...	53.63	
				7,800.00	...do...	....	
......	....	Wood.	2,201.12	25.00	Unserviceable.	....	Do.
......	....	...do...	319.00	[1] 34.00	Poor..	(2)	Do.

---

[2] Fifty-two wooden flats repaired during the year at a cost of $368.43; average, $7.08.

TABLE 3.—*Statement of floating plant owned by the United States and*

ST. LOUIS, MO.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
No. 146	Flats	25.00	40 0	16 0	2 6	1900	Leavenworth, Ind.
No. 147							
No. 148							
No. 149							
No. 150							
No. 151							
No. 152							
No. 153							
No. 154							
No. 155							
No. 156							
No. 157							
No. 158							
No. 159							
No. 160							
No. 161							
No. 162							
No. 163							
No. 164							
No. 165							
No. 166							
No. 167							
No. 1	do	40.00	55 0	16 0	3 0	1903	St. Louis, Mo.
No. 2							
No. 3							
No. 4							
No. 5							
No. 6							
No. 7							
No. 8							
No. 9	do						
No. 10							
No. 11							
No. 12							
No. 13							
No. 14							
No. 15							
No. 16							
No. 17							
No. 18							
No. 19							
No. 20							
No. 21	do	40.00	55 0	16 0	3 0	1911	Ambridge, Pa.
No. 22							
No. 23							
No. 24							
No. 25							
No. 26							
No. 27							
No. 28							
No. 29							
No. 30							
No. 31							
No. 32							
No. 33							
No. 34							
No. 35							
No. 36							
No. 37	do	40.00	55 0	16 0	3 0	1911	do
No. 38							
No. 39							
No. 40							
No. 41							
No. 42							
No. 43							

[1] Each.

[2] Fifty-two wooden flats repaired during the year at a cost of $368.43; average, $7.08.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ST. LOUIS, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	[1] $319.00	[1] $34.00	Poor..	([2])	Mississippi River between mouths of Ohio and Missouri Rivers.
......	....	Steel..	[1] 1,741.57	[1] 1,200.00	Good..	([2])	Do.
......	....	....	....	[1] 1,000.00	...do...	([2])	Do.
......	....	Steel..	[1] 1,690.65	[1] 915.00	...do...	([2])	Do.
......	....	...do..	[1] 1,690.64	[1] 915.00	...do..	([2])	Do.

---

[2] Sixty-three steel flats repaired during the year at a cost of $466.67; average $7.40.

TABLE 3.—*Statement of floating plant owned by the United States ar*

ST. LOUIS, MO.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	Ft. in.	Ft. in.		
No. 44	Flats	40.00	55 0	16 0	3 0	1911	Ambridge, Pa
No. 45							
No. 46							
No. 47							
No. 48							
No. 49							
No. 50							
No. 51							
No. 52							
No. 53							
No. 54							
No. 55							
No. 56							
No. 57							
No. 58							
No. 59							
No. 60	do	40.00	55 0	16 0	3 0	1912	do
No. 61							
No. 62							
No. 63							
No. 1	Yawl	1.00	25 0	4 8	2 6	1898	St. Joseph, Mich
No. 21	do	1.00	20 0	5 5	1 10	1896	St. Louis, Mo
No. 22							
No. 23							
No. 24							
No. 25							
No. 26							
No. 63	Skiff	.75	19 9	5 3	1 4	1894	do
No. 64							
No. 65							
No. 66							
No. 67							
No. 68							
No. 69							
No. 70							
No. 71							
No. 72							
No. 73							
No. 74							
No. 75							
No. 76							
No. 77							
No. 78							
No. 79							
No. 80							
No. 81							
No. 82							
No. 83							
No. 84							
No. 85							
No. 86	do	.75	19 9	5 3	1 4	1894	do
No. 87							
No. 88							
No. 89							
No. 90							
No. 92							
No. 93							
No. 94							
No. 97	do	.75	24 0	4 8	1 4	1895	do
No. 98							
No. 99							
No. 100							
No. 101							
No. 102							
No. 105							
No. 106							
No. 107							

[1] Each.

[2] Sixty-three steel flats repaired during the year at a cost of $466.67; average, $7.40.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ST. LOUIS, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Steel..	[1] $1,629.74	[1] $915.00	Good..	([2])	Mississippi River between mouths of Ohio and Missouri Rivers.
......	....	...do..	[1] 1,652.33	[1] 915.00	...do..	([2])	Do.
......	....	Wood.	106.00	15.00	Poor..	([3])	Do.
......	....	...do..	[1] 85.00	[1] 12.00	...do..	([3])	Do.
......	....	...do..	[1] 30.00	5.00	...do..	([3])	Do.
......	....	...do..	[1] 30.00	[1] 5.00	...do..	([3])	Do.
......	....	...do..	[1] 30.00	[1] 5.00	...do..	([3])	Do.

[3] Sixty-eight wood skiffs and yawls repaired during the year, at a cost of $393.32; average, $5.75.

TABLE 3.—*Statement of floating plant owned by the United States and*

ST. LOUIS, MO.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 108	Skiff	0.75	24 0	4 8	1 4	1895	St. Louis, Mo
No. 109							
No. 113	....do	.75	19 8	4 6	1 3	1911	Fond du Lac, Wis
No. 114							
No. 115							
No. 116							
No. 117							
No. 118							
No. 119							
No. 120							
No. 121							
No. 122							
No. 123							
No. 124							
No. 125	....do	.75	19 8	4 6	1 3	1911	....do
No. 126							
No. 127							
No. 128							
No. 129							
No. 130							
No. 131							
No. 201	....do	.75	19 6	4 6	1 3	1911	Grafton, Ill
No. 202							
No. 203							
No. 206							
No. 207							
No. 208							
No. 209							
No. 210							
No. 211							
No. 212							
No. 213							
No. 214							
No. 215							
No. 216							
No. 217							
No. 218							
No. 219							
No. 220							
No. 1001	....do	.75	24 8	5 6	1 11	1915	....do

ST. LOUIS, MO. (MISSISSIPPI RIVER COMMISSION).

Name or number.	Type.	Displacement in long tons.	Length.	Beam.	Depth.	When.	Where.
Beta	Hydraulic pipe-line dredge (nonpropelling).	1,300.00	214 0	58 0	6 11	[4] 1896	Pittsburgh, Pa
Gamma	Hydraulic pipe-line dredge (self-propelling, twin screw).	581.00	165 6	38 0	7 10	[4] 1897	Jeffersonville, Ind
Delta	Hydraulic pipe-line dredge (nonpropelling).	830.00	185 6	38 0	8 4	1897	Clifton Terrace, Ill
Epsilon	....do	650.00	162 0	40 0	7 6	1898	Grafton, Ill
Zeta	....do	650.00	162 0	40 0	7 6	1898	....do
Iota	Hydraulic pipe-line dredge self-propelling, side-wheel).	800.00	192 0	44 0	7 0	1900	....do
Kappa	....do	834.00	192 0	44 0	7 0	1901	....do
Flad Henry	....do	834.00	192 0	44 0	7 0	[5] 1901	....do
Harrod B. M.	....do	1,270.00	210 0	44 0	8 6	1907	....do

---

[1] Each.

[2] Sixty-eight wood skiffs and yawls repaired during the year at a cost of $393.32; average, $5.75.

[3] No steel skiffs repaired during year.

[4] Rebuilt in 1898, Des Moines Rapids Canal Dry Dock.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ST. LOUIS, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
......	....	Wood.	[1] $60.00	[1] $5.00	Poor..	(3)	Mississippi River between mouths of Ohio and Missouri Rivers.
......	....	...do..	[1] 35.90	[1] 12.00	Fair...	(3)	Do.
......	....	...do..	35.90	[1] 15.00	...do..	(3)	Do.
......	....	Steel..	42.50	[1] 23.00	Good .	(3)	Do.
......	....	...do..	65.00	55.00	...do..	(3)	Removing obstructions in Mississippi, Atchafalaya, and Old Rivers.

ST. LOUIS, MO. (MISSISSIPPI RIVER COMMISSION).

....	Steel..	$218,782.25	$63,000.00	(5)	$413.95	Improving Mississippi River under Mississippi River Commission, works in charge of secretary.
....	...do...	85,530.60	66,000.00	Good .	4,989.18	Do.
....	...do...	124,940.00	29,000.00	Fair...	1,568.88	Do.
....	...do...	102,000.00	33,000.00	...do...	3,782.37	Do.
....	...do...	109,000.00	30,000.00	...do...	5,674.89	Do.
....	...do...	100,479.79	50,000.00	Good [7]	4,452.57	Do.
....	...do...	135,400.00	73,000.00	Good .	9,092.67	Do.
....	...do...	135,400.00	94,000.00	...do...	15,628.52	Do.
....	Iron and steel.	238,998.17	168,000.00	...do...	22,779.69	Do.

[5] Unserviceable without extensive repairs.
[6] Remodeled at West Memphis, Ark., 1915.
[7] Except boilers.
[8] Upper works burned Jan. 11, 1908; rebuilt at West Memphis, Ark., February, 1908, to January, 1909.

TABLE 3.—*Statement of floating plant owned by the United States and*

ST. LOUIS, MO. (MISSISSIPPI RIVER COMMISSION)—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Mississippi	Stern-wheel steamboat	540.00	200	11	32	0	6	0	[1] 1882	Carondelet, Mo
Sachem	Stern-wheel towboat	560.00	199	4	36	0	5	6	1899	Dubuque, Iowa
Choctaw	do	560.00	199	4	36	0	5	6	1899	do
Nokomis	do	560.00	199	4	36	0	5	6	1899	do
Leota	do	560.00	199	4	36	0	5	6	1899	do
Inspector, M. R. C	Twin-screw steamboat, tunnel type.	258.00	144	0	26	0	6	0	1915	Charleston, W. Va
John Ewens	Stern-wheel steamboat	162.00	136	6	21	0	4	10	1913	Jeffersonville, Ind
Jupiter	do	120.00	118	0	20	0	4	6	1912	do
Saturn	do	120.00	118	0	20	0	4	6	1912	do
Vulcan [3]	do	83.00	95	0	17	0	3	9	1897	Dubuque, Iowa
Mercury	do	83.00	94	6	17	0	3	9	1899	Jeffersonville, Ind
Venus	do	83.00	94	6	17	0	3	9	1899	do
Mars	do	83.00	94	6	17	0	3	9	1899	do
Bolivar	Gasoline motor skiff	.90	25	0	5	0	1	11	[2] 1913	Grafton, Ill
Obion	do	.90	25	0	5	0	1	11	1913	do
Hydrog	do	1.83	24	10	5	7	1	7	1911	St. Louis, Mo
M. R. C. No. 1	do	.81	19	6	4	10	1	3	1909	Leavenworth, Ind
M. R. C. No. 2	do	.81	19	6	4	10	1	3	1909	do
M. R. C. No. 4	do	.81	19	6	4	10	1	3	1909	do
M. R. C. No. 1	Derrick boat	132.00	80	0	36	0	5	0	1914	Hull, Jeffersonville, Ind.; deck house, West Memphis, Ark.
No. 13	Pile sinker	54.00	68	0	20	0	3	6	1894	Cincinnati, Ohio
No. 971	do	56.00	76	0	25	0	3	10	1897	do
No. 981	do	56.00	76	0	25	0	3	10	1898	do
No. 982	do	56.00	76	0	25	0	3	10	1898	do
No. 983	do	56.00	76	0	25	0	3	10	1898	do
Wabash No. 3	Quarter boat	53.00	102	4	22	0	3	0	1911	Terre Haute, Ind
No. 041	Barge	35.00	80	0	20	0	4	0	1904	West Memphis, Ark.
No. 051	do	35.00	80	0	20	0	4	0	1905	do
No. 1	Pump boat	30.00	65	0	16	0	4	6	1905	do
No. 1	Calking flat		24	6	6	0	1	2	1904	do

ST. PAUL, MINN.

Name or number.	Type.	Displacement in long tons.	Length.		Beam.		Depth.		When.	Where.
Manito	Orange peel bucket revolving dredge.	307.00	106	0	44	0	7	0	1914	Cohasset, Minn
Wigwam	Quarter boat	49.00	70	0	22	0	3	3	1914	do
Wampum	Office and store boat	44.00	70	0	22	0	3	3	1914	do
Animiki	Tug, gasoline	11.00	55	0	11	10	3	9	1914	do
Nodin	Launch	1.00	30	3	5	3	2	8	1915	St. Paul, Minn
Nawapon	Scow, gasoline tank	37.00	60	6	16	0	4	2	1911	Cohasset, Minn
Tigo	Scow, water tank	18.00	31	6	12	0	3	4	1914	do
Amik	Scow, coal	18.5	68	6	16	0	4	7	1914	do
Niggik	do	18.5	68	6	16	0	4	7	1914	do
M-1	Skiff	.14	18	0	4	6	1	10	1914	do
M-2	do	.11	16	0	4	0	1	6	1914	do
M-3	do	.11	16	0	4	0	1	6	1914	do
M-4	do	.09	14	0	3	10	1	4	1914	do
M-5	do	.06	10	0	2	10	0	10	1912	do
M-6	do	.25	19	9	5	3	1	4	(2)	Unknown
M-7	do	.05	18	0	3	0	1	2	1917	Stillwater, Minn
Bequoq	Canoe	.03	17	0	2	10	1	2	1910	Veazie, Me

[1] Upper works burned Jan. 16, 1893; rebuilt at St. Louis, Mo., 1893.

[2] Except boilers.

[3] Sunk at West Memphis, Ark., Mar. 20, 1913; raised Dec. 15, 1913, and rebuilt at West Memphis, Ark., 1914–15.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ST. LOUIS, MO. (MISSISSIPPI RIVER COMMISSION)—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Steel	$45,000.00	$31,000.00	Fair [3]	$9,339.76	Improving Mississippi River under Mississippi River Commission, works in charge of secretary.
		do	45,672.00	19,000.00	Good	2,088.18	Do.
		do	45,672.00	18,000.00	Fair	978.29	Do.
		do	45,672.00	18,000.00	Good		Do.
		do	45,672.00	18,500.00	Fair	2,785.16	Do.
		do	64,500.00	63,500.00	Good	2,548.34	Do.
		do	23,490.00	23,200.00	do	2,027.35	Do.
		do	17,175.00	15,800.00	do	1,334.37	Do.
		do	17,175.00	15,000.00	do	952.32	Do.
		do	7,080.00	4,700.00	Fair	613.64	Do.
		do	7,749.00	5,500.00	do	247.26	Do.
		do	7,749.00	4,200.00	do	430.79	Do.
		do	7,749.00	6,200.00	do	443.93	Do.
1913	Grafton, Ill	Wood	333.75	270.00	do		Do.
1913	do	do	333.75	270.00	Good		Do.
1911	St. Louis, Mo	do	350.50	210.00	Bad		Do.
[4] 1909	Leavenworth, Ind.	do	203.67	160.00	Fair		Do.
[4] 1909	do	do	263.67	160.00	do		Do.
[4] 1909	do	do	224.50	160.00	Good		Do.
		Steel	14,171.22	12,700.00	do	372.42	Do.
		Wood	4,500.00	2,400.00	Fair	292.40	Do.
		do	2,165.00	900.00	Bad	182.65	Do.
		do	[5] 2,384.00	2,110.00	do	1,061.28	Do.
		do	[5] 2,384.00	850.00	do	29.59	Do.
		do	[5] 2,384.00	1,750.00	Good	131.94	Do.
1912	U. S. Engineer Office, Louisville, Ky.	do	1,131.30	950.00	Bad	61.54	Do.
		do	1,205.96	310.00	Fair		Do.
		do	1,605.47	920.00	do	265.57	Do.
		do	1,456.02	750.00	Bad	17.18	Do.
		do	52.77	30.00	Good		Do.

ST. PAUL, MINN.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Not purchased	Wood	$41,000.00	$30,000.00	Good	$4,550.37	Mississippi and Leech Rivers, Minn.
	do	do	5,702.46	4,000.00	do	100.00	Do.
	do	do	4,335.78	3,000.00	do	100.00	Do.
	do	do	5,933.02	3,500.00	do	88.25	Do.
1915	St. Paul, Minn	do	978.00	500.00	Fair	59.54	Do.
1915	Cohasset, Minn	do	162.50	300.00	do	25.00	Do.
	Not purchased	do	903.78	600.00	Good	25.00	Do.
	do	do	1,120.07	750.00	do	35.69	Do.
	do	do	1,196.09	750.00	do	25.00	Do.
	do	do	94.09	40.00	Fair		Do.
	do	do	65.00	30.00	do		Do.
	do	do	65.00	30.00	do	2.50	Do.
	do	do	60.00	25.00	do	2.50	Do.
1915	Cohasset, Minn	do	25.00	Worthless	Worthless.		Do.
(1)	Unknown	do	(6)	80.00	Good	2.50	Do.
1917	Stillwater, Minn	do	50.00	45.00	do		Do.
1911	Warroad, Minn	do	44.00	19.00	Fair	3.00	Do.

[4] Altered to motor skiff at West Memphis, Ark., 1910.

[5] Approximate.

[6] Unknown.

TABLE 3.—*Statement of floating plant owned by the United States and*

ST. PAUL, MINN.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Oriole	Snag boat	85.00	107	0	22	4	5	0	1908	Aitkin, Minn
O-1	Skiff	.08	16	0	3	8	1	4	1908	St. Paul, Minn
O-2	do	.08	16	0	3	10	1	4	1910	Oshkosh, Wis
O-3	do	.12	17	6	4	4	1	5	1915	St. Paul, Minn
Warroad	Hydraulic pipe-line dredge.	260.00	158	0	27	0	8	6	1904	Warroad, Minn
6	Pipe floats	[1]4.00	24	0	10	0	2	4	1904	do
1	Fuel barge	15.00	50	0	14	0	2	11	1904	do
1	Derrick barge	15.00	50	0	14	0	2	11	1904	do
Bull Calf	Gasoline launch	1.00	23	0	6	3	3	4	1906	Roseau, Minn
3	Rowboats	[1].08	16	0	3	8	1	4	1908	St. Paul, Minn
6	do	[1].08	15	6	3	10	1	4	1913	Alexandria, Minn
1	Skiff	.25	19	9	5	3	1	4	(2)	Unknown

VICKSBURG, MISS.

Name or number.	Type.	Displacement in long tons.	Length.		Beam.		Depth.		When.	Where.
Waterway	Hydraulic pipe-line dredge (self-propelling).	417.00	163	0	34	0	7	0	1912	Dubuque, Iowa
Ben Humphreys	Combination snag boat and bucket dredge.	286.60	155	6	32	0	5	0	1908	Jeffersonville, Ind
Jos. E. Ransdell	Stern-wheel snag boat	286.60	155	6	32	0	5	0	1908	do
Thos. B. Florence	do	107.00	109	6	20	0	4	0	[3]1875	South St. Louis, Mo.
C. W. Howell	do	304.46	166	0	36	0	5	0	[4]1881	do
L'Eau Noir	Gasoline launch	7.60	40	0	9	3	5	6	1917	Milwaukee, Wis
Ouachita [5]	do	17.00	65	6	10	5	4	0	1897	Charleston, W. Va
Roland	do	2.00	24	4	4	10	3	4	1914	Grafton, Ill
Franklin	do	3.00	29	0	7	0	3	10	1914	do
No. 1	Steam derrick boat	105.55	95	0	32	0	3	0	1909	Vicksburg, Miss
No. 2	do	54.17	65	0	24	0	3	0	1910	Arkadelphia, Ark
No. 116 [6]	do	69.47	69	0	29	0	4	0	1907	Vicksburg, Miss
No. 3	Quarter boat	34.00	68	0	18	0	3	0	1897	Camden, Ark
No. 5	do	34.00	68	0	18	0	3	0	1904	Shreveport, La
No. 95	do	34.00	68	0	18	0	3	0	1908	do
No. 10	do	34.00	68	0	18	0	3	0	1908	Jonesville, La
No. 11	do	34.00	68	0	18	0	3	0	1908	Vicksburg, Miss
No. 4, Oa. R.[8]	Maneuver boat	36.00	60	0	25	0	4	0	1911	Monroe, La
No. 6, Oa. R.[9]	do	75.00	80	0	30	0	4	0	1912	New Orleans, La
No. 8, Oa. R.[10]	do	50.00	60	0	25	0	4	0	1912	do
No. 1, B. Sr. R.[11]	do	75.00	80	0	30	0	4	0	1912	do
No. 9081	Scow barge (65 tons)	27.80	50	0	20	0	4	0	1908	Vicksburg, Miss
No. 9085	Scow barge (120 tons)	38.20	60	0	25	0	5	0	1908	do
No. 9111	Scow barge (200 tons)	117.00	80	0	40	0	4	0	1911	Monroe, La
No. 9121	Scow barge (150 tons)	75.00	80	0	30	0	4	0	1912	New Orleans, La
No. 9112	Catamaran barge	71.00	60	0	30	0	4	0	1911	do
No. 9124	Scow barge (175 tons)	65.00	100	0	28	0	5	0	1912	do
No. 9125	do	65.00	100	0	28	0	5	0	1912	do
No. 9126	Scow barge (50 tons)	32.00	50	0	25	0	4	0	1912	do

---

[1] Unknown.

[2] Each.

[3] Repaired 1885, South St. Louis, Mo., repaired 1900. Dubuque, Iowa.

[4] Repaired 1900, Dubuque, Iowa.

[5] Formerly No. 92850, Madge.

[6] Formerly scow barge No. 116.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

ST. PAUL, MINN.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1910	Libby, Minn.	Wood.	$3,500.00	$8,000.00	Fair.	$3.65	Mississippi between Brainerd and Grand Rapids, Minn.
1908	St. Paul, Minn.	do.	29.70		Worthless.		Do.
1912	Cohasset, Minn.	do.	20.00		do.		Do.
1915	St. Paul, Minn.	do.	41.00	30.00	Good.		Do.
		do.	26,500.00	8,500.00	Poor (hull).	2.15	Improving Warroad Harbor and River, Minn.
		do.	1,170.00	150.00	Poor.		Do.
		do.	450.00	25.00	do.		Do.
		do.	450.00	25.00	do.		Do.
1911	Warroad, Minn.	do.	375.00	100.00	do.		Do.
1908	St. Paul, Minn.	do.	29.70	[1] 5.00	Fair.		Operating and care of canals, etc.
1913	Alexandria, Minn.	do.	37.80	[1] 18.00	Good.		Do.
(³)	Unknown.	do.	(²)		Worthless.		Do.

VICKSBURG, MISS.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Steel.	$100,304.00	$77,000.00	Fair.	$472.73	Red River, La. and Ark.
		Iron and steel.	42,483.00	25,000.00	Good.	910.64	Yazoo River, Miss.
		do.	42,483.00	22,000.00	do.	516.71	Ouachita River, Ark. and La.
1875	South St. Louis, Mo.	do.	14,000.00	4,500.00	Fair.		Red River, La. and Ark.
		do.	44,650.00	12,000.00	do.	687.68	Do.
1917	Milwaukee, Wis.	Wood.	8,500.00	8,500.00	Good.	141.63	Ouachita River, Ark. and La.
1903	Charleston, W. Va.	Steel.	5,490.00	2,000.00	Fair.	164.47	Do.
1914	Grafton, Ill.	do.	286.50	400.00	do.	315.25	Do.
1914	do.	do.	558.69	400.00	do.	21.98	Do.
		Wood.	3,200.00	1,000.00	Poor.	2,017.59	Big Sunflower River, Miss.
		do.	3,600.00	1,000.00	do.	99.42	Ouachita River, Ark. and La.
		do.	2,100.00	2,200.00	Fair.	2,708.80	Big Sunflower River, Miss.
1897	Camden, Ark.	Steel.	600.00	1,100.00	Good.		Ouachita River, Ark. and La.
		do.	1,810.00	1,100.00	do.		Red River, La. and Ark.
		do.	1,300.00	1,100.00	Good.		Do.
		do.	1,400.00	1,100.00	do.		Ouachita River, Ark. and La.
		Wood.	1,500.00	1,000.00	Fair.	903.15	Big Sunflower River, Miss.
		do.	2,300.00	3,200.00	do.	1,010.86	Ouachita River, Ark. and La.
		do.	3,635.00	3,400.00	Good.		Do.
		do.	2,500.00	2,800.00	do.	260.00	Do.
		do.	5,713.00	3,400.00	Fair.		Big Sunflower River, Miss.
		do.	1,200.00	600.00	do.		Do.
		do.	1,700.00	1,300.00	do.		Do.
		do.	3,775.00	5.00	Very poor.	54.40	Ouachita River, Ark. and La.
		do.	3,635.00	2,300.00	Fair.		Big Sunflower River, Miss.
		do.	2,550.00	5.00	Very poor.		Ouachita River, Ark. and La.
		do.	3,700.00	800.00	Fair.	238.45	Do.
		do.	3,700.00	800.00	do.	186.50	Do.
		do.	2,600.00	500.00	do.		Do.

---

[7] Repaired with new steel hulls, 1915.
[8] Formerly No. 9113.
[9] Formerly No. 9122.
[10] Formerly No. 9127.
[11] Formerly No. 9123.

TABLE 3.—*Statement of floating plant owned by the United States and*

VICKSBURG, MISS. (THIRD MISSISSIPPI RIVER).

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
Boas	Screw-propelled steam tug.	73.50	65	0	16	3	7	0	1871	Pittsburgh, Pa.
White Water	do	145.00	83	0	19	0	9	0	1875	Camden, N. J.
Sydney C	do	96.00	69	5	15	3	7	10	1907	New Orleans, La.
Control [1]	Stern-wheel steamboat	232.90	157	0	29	0	4	0	1905	Jeffersonville, Ind
H. St. L. Coppee	do	350.45	166	0	30	0	6	0	1904	do
Arthur Hider	do	350.45	163	0	30		6	0	1898	do
Issaquena	do	362.60	171	0	30	0	6	0	1913	do
Chicot	Screw gas-propelled launch.	4.20	35	5	6	6	3	3	1913	Grafton, Ill
Carroll	do	15.00	51	5	11	5	4	0	1912	Rosedale, Miss
No. 1015	Floating dry dock	384.20	158	8	54	6	4	9	1910	Ambridge, Pa
No. 1011	Steam hydraulic grader	229.46	120	0	30	0	6	0	1910	do.[2]
No. 1012	do	229.46	120	0	30	0	6	0	1910	do.[2]
No. 1013	do	222.40	120	0	30	0	6	0	1910	do.[2]
No. 1014	do	222.40	120	0	30	0	6	0	1910	do.[2]
No. 079	Carpenter shop boat	170.00	120	0	30	0	6	0	1904	Levanna, Ohio [2]
No. 071 [3]	Steam derrick boat	170.00	120	0	30	0	6	0	1907	do.[2]
No. 1109	do	45.10	96	0	24	0	5	0	1911	Memphis, Tenn
No. 1311	do	66.90	100	0	24	0	5	0	1913	do
No. 1503	do	150.00	120	0	30	0	7	0	1915	Vicksburg, Miss.[2]
No. 1504	do	150.00	120	0	30	0	7	0	1915	do.[2]
No. 072 [3]	Concrete-mixing plant	200.00	120	0	30	0	6	0	1907	Levanna, Ohio [2]
No. 1509 [3]	do	200.00	120	0	30	0	7	0	1915	Vicksburg, Miss.[2]
No. 1709	do	200.00	12	0	30	0	7	0	1917	do.[2]
No. 1711	do	200.00	120	0	30	0	7	0	1917	do.[2]
No. 1712	do	222.00	130	0	37	6	7	0	1917	do.[2]
No. 1312	Sand and gravel digger	123.00	68	0	23	0	5	4	1913	Unknown
No. 131	Quarter boat	186.00	131	0	30	0	5	0	1881	Stillwater, Minn
No. 155	do	107.00	120	0	28	0	6	0	1883	Not known
No. 156	do	107.00	120	0	28	0	6	0	1883	do
No. 157	do	107.00	120	0	28	0	6	0	1883	do
No. 159	do	107.00	120	0	30	0	6	0	1883	Not known
No. 1010	do	177.00	135	0	34	0	5	0	1910	Keokuk, Iowa
No. 1107	do	177.00	140	0	34	0	5	0	1911	New Orleans, La.
No. 1108	do	177.00	140	0	34	0	5	0	1911	do
No. 1201	do	177.00	140	0	34	0	5	0	1912	do
No. 1202	do	177.00	140	0	34	0	5	0	1912	do
No. 1307	do	177.00	140	0	34	0	5	0	1913	do
No. 1308	do	177.00	140	0	34	0	5	0	1913	do
No. 1513	do	77.80	86	0	22	0	4	9	1915	Vicksburg, Miss.
No. 1607	do	41.20	62	6	18	0	3	6	1916	do
No. 089	Mattress boat	119.00	135	0	34	0	5	0	1908	New Orleans, La.
No. 0810	do	119.06	135	0	34	0	5	0	1908	do
No. 1134	do	119.00	134	0	34	0	5	0	1911	do
No. 1135	do	119.00	134	0	34	0	5	0	1911	do
No. 1136	do	119.00	134	0	34	0	5	0	1911	Gulfport, Miss.
No. 1137	do	119.00	134	0	34	0	5	0	1911	do
No. 1608	Mattress boat (concrete mats).	340.00	160	0	45	0	10	0	1916	Vicksburg, Miss.
No. 1713	do	340.00	160	0	45	0	10	0	1917	do
No. 111	Scow barge (30 tons)	15.00	60	0	15	0	3	0	1884	Not known
No. 112	do	15.00	60	0	15	0	3	0	1884	do
No. 568	Scow barge (400 tons)	80.00	120	0	30	0	6	0	1900	Levanna, Ohio
No. 572	Scow barge	80.00	120	0	30	0	6	0	1900	do
No. 579 [3]	do	80.00	120	0	30	0	6	0	1904	do
No. 580	do	80.00	120	0	30	0	6	0	1904	do
No. 581	do	80.00	120	0	30	0	6	0	1904	do
No. 582	do	80.00	120	0	30	0	6	0	1904	do
No. 584	do	80.00	120	0	30	0	6	0	1904	do
No. 585	do	80.00	120	0	30	0	6	0	1904	do
No. 587	do	80.00	120	0	30	0	6	0	1904	do
No. 589	do	80.00	120	0	30	0	6	0	1904	do
No. 073	do	80.00	120	0	30	0	6	0	1907	do
No. 074	do	80.00	120	0	30	0	6	0	1907	do
No. 077	Scow barge (400 tons)	80.00	120	0	30	0	6	0	1907	do
No. 078	Scow barge	80.00	120	0	30	0	6	0	1907	do
No. 079	do	80.00	120	0	30	0	6	0	1907	do

---

[1] Formerly Scimitar II.

[2] Machinery, etc., installed at Vicksburg, Miss.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

VICKSBURG, MISS. (THIRD MISSISSIPPI RIVER).

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1911	New Orleans, La	Iron...	$10,000.00	$10,600.00	Good	$641.14	
1911	.....do	...do	15,000.00	15,900.00	...do	2,446.12	
1916	Greenville, Miss	Steel	7,730.00	7,420.00	...do	784.32	
1906	Paducah, Ky	Wood	12,000.00	6,780.00	Fair	1,025.54	
		Steel	53,900.00	28,844.00	...do	2,899.08	
		...do	37,450.00	35,950.00	...do	2,495.78	
		...do	62,640.00	49,635.00	...do	2,999.25	
		...do	1,877.75	1,320.00	...do	695.73	
1916	L. Providence, La	Wood	2,400.00	3,356.00	...do	200.24	
		Steel	39,000.00	28,440.00	...do	78.90	
		...do	31,288.00	23,748.00	...do	10.90	
		...do	31,592.00	23,748.00	...do	77.85	
		...do	25,000.00	22,000.00	...do	126.79	
		...do	34,381.74	31,856.00	...do	3,415.72	
		Wood	6,019.00	6,640.00	Bad	479.22	
		...do	7,000.00	6,580.00	Good	159.23	
1915		...do	2,250.00	1,865.00	Fair	426.12	
1915		...do	2,750.00	2,335.00	...do	572.69	
		...do	8,424.35	7,580.00	Good	101.16	
		...do	8,410.40	7,580.00	...do	221.62	
		...do	9,000.00	8,460.00	...do	780.29	
		...do	12,500.00	11,875.00	...do	462.63	
		...do	6,074.37	5,771.00	...do	2,158.10	
		...do	9,471.31	8,628.00	...do	4,663.04	
		...do	15,865.37	15,072.00	...do	11,135.93	
1917	Greenville, Miss	...do	5,300.00	8,300.00	...do	222.12	
		...do	5,000.00	5,200.00	Fair	977.88	
		...do	922.00	887.00	Bad	128.37	
		...do	2,093.00	1,867.00	...do	279.57	
		...do	800.00	752.00	...do	267.54	
		...do	2,477.00	1,100.00	...do	324.96	
		...do	8,500.00	6,100.00	Fair	889.23	
		...do	13,164.00	9,900.00	Good	3.95	
		...do	13,105.00	9,900.00	...do	128.35	
		...do	13,386.00	9,900.00	...do	122.56	
		...do	13,141.00	9,900.00	...do	29.62	
		...do	12,980.00	10,400.00	...do	321.34	
		...do	12,980.00	10,400.00	...do	148.65	
		...do	3,535.00	3,200.00	...do	88.98	
		...do	2,197.84	1,900.00	...do	15.62	
		...do	6,900.00	2,600.00	Fair		
		...do	6,900.00	2,600.00	...do		
		...do	5,860.00	4,300.00	Good	301.05	
		...do	5,860.00	4,300.00	...do	316.11	
		...do	7,334.00	4,900.00	...do	1,179.88	
		...do	7,322.00	4,900.00	...do	1,317.56	
		...do	19,000.00	18,000.00	...do	1,969.91	
		...do	29,279.02	29,279.00	...do		
		...do	750.00	680.00	Fair		
		...do	Unknown.	340.00	...do		
		...do	2,846.00	Nominal.	Bad		
		...do	2,846.00	1,100.00	Fair	120.14	
		...do	3,184.00	1,300.00	...do	27.86	
		...do	3,184.00	1,100.00	...do	317.14	
		...do	3,184.00	1,300.00	...do		
		...do	3,184.00	1,300.00	...do	160.84	
		...do	3,184.00	1,300.00	...do		
		...do	3,184.00	Nominal.	Bad	101.18	
		...do	3,184.00	550.00	...do	3.25	
		...do	3,184.00	800.00	Fair		
		...do	3,972.00	1,900.00	Good	314.68	
		...do	3,972.00	1,900.00	...do	120.50	
		...do	4,200.00	2,500.00	...do		
		...do	4,200.00	2,500.00	...do		
		...do	4,200.00	1,750.00	...do		

[a] Formerly scow barges of same numbers.

TABLE 3.—*Statement of floating plant owned by the United States and*

VICKSBURG, MISS. (THIRD MISSISSIPPI RIVER—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
No. 081	Scow barge	80.00	120 0	30 0	6 0	1908	Levanna, Ohio
No. 082	do	80.00	120 0	30 0	6 0	1908	do
No. 083[1]	do	80.00	120 0	30 0	6 0	1908	do
No. 084	do	80.00	120 0	30 0	6 0	1908	do
No. 086[1]	do	71.25	120 0	30 0	6 0	1910	Keokuk, Iowa
No. 101	do	71.25	120 0	30 0	6 0	1910	do
No. 102	do	71.25	120 0	30 0	6 0	1910	do
No. 103	do	71.25	120 0	30 0	6 0	1910	do
No. 104	do	71.25	120 0	30 0	6 0	1910	do
No. 105	do	71.25	120 0	30 0	6 0	1910	do
No. 106	do	71.25	120 0	30 0	6 0	1910	do
No. 107	do	71.25	120 0	30 0	6 0	1910	do
No. 108	do	71.25	120 0	30 0	6 0	1910	do
No. 109	Scow barge (30 tons)	15.00	64 0	16 0	3 0	1910	do
No. 1101	Scow barge (450 tons)	122.50	120 0	30 0	7 0	1911	New Orleans, La.
No. 1102	Scow barge	122.50	120 0	30 0	7 0	1911	do
No. 1103	do	122.50	120 0	30 0	7 0	1911	do
No. 1104	do	122.50	120 0	30 0	7 0	1911	do
No. 1105	do	122.50	120 0	30 0	7 0	1911	do
No. 1106	do	122.50	120 0	30 0	7 0	1911	do
No. 1203	do	107.20	120 0	30 0	7 0	1912	Ambridge, Pa
No. 1204	do	107.20	120 0	30 0	7 0	1912	do
No. 1205	do	107.20	120 0	30 0	7 0	1912	do
No. 1206	do	107.20	120 0	30 0	7 0	1912	do
No. 1207	do	107.20	120 0	30 0	7 0	1912	do
No. 1208	do	107.20	120 0	30 0	7 0	1912	Ambridge. Pa
No. 1209	do	107.20	120 0	30 0	7 0	1912	do
No. 1301	Scow barge (450 tons)	107.20	120 0	30 0	7 0	1912	do
No. 1302	Scow barge	107.20	120 0	30 0	7 0	1912	do
No. 1303	do	107.20	120 0	30 0	7 0	1912	do
No. 1304	do	107.20	120 0	30 0	7 0	1912	do
No. 1305	do	107.20	120 0	30 0	7 0	1912	do
No. 1306	do	107.20	120 0	30 0	7 0	1912	do
No. 1310	Scow barge (30 tons)	17.00	64 0	16 0	3 0	1913	New Orleans, La.
No. 1401	Scow barge (450 tons)	122.50	120 0	30 0	7 0	1914	do
No. 1402	Scow barge	122.50	120 0	30 0	7 0	1914	do
No. 1403	do	122.50	120 0	30 0	7 0	1914	do
No. 1404	do	122.50	120 0	30 0	7 0	1914	do
No. 1405	do	122.50	120 0	30 0	7 0	1914	do
No. 1406	do	122.50	120 0	30 0	7 0	1914	do
No. 1501	Scow barge (400 tons)	109.80	120 0	30 0	7 0	1915	Vicksburg, Miss.
No. 1502	Scow barge	109.80	120 0	30 0	7 0	1915	do
No. 1505	do	109.80	120 0	30 0	7 0	1915	do
No. 1506	do	109.80	120 0	30 0	7 0	1915	do
No. 1507	do	109.80	120 0	30 0	7 0	1915	do
No. 1510	do	109.80	120 0	30 0	7 0	1915	do
No. 1511	do	109.80	120 0	30 0	7 0	1915	do
No. 1512	do	109.80	120 0	30 0	7 0	1915	do
No. 1601	Scow barge (450 tons)	100.00	120 0	30 0	7 0	1916	Ambridge, Pa
No. 1602	Scow barge	100.00	120 0	30 0	7 0	1916	do
No. 1603	do	100.00	120 0	30 0	7 0	1916	do
No. 1604	do	100.00	120 0	30 0	7 0	1916	do
No. 1605	do	100.00	120 0	30 0	7 0	1916	do
No. 1606	do	100.00	120 0	30 0	7 0	1916	do
No. 1	Flat boat	1.67	30 0	6 0	1 0	1894	Greenville, Miss.
No. 2	do	1.67	30 0	6 0	1 0	1894	Vicksburg, Miss.
No. 6	do	4.90	38 0	14 0	2 0	1912	do
No. 1701	Scow barge (400 tons)	109.80	120 0	30 0	7 0	1917	do
No. 1702	Scow barge	109.80	120 0	30 0	7 0	1917	do
No. 1703	do	109.80	120 0	30 0	7 0	1917	do
No. 1704	do	109.80	120 0	30 0	7 0	1917	do
No. 1705	do	109.80	120 0	30 0	7 0	1917	do
No. 1706	do	109.80	120 0	30 0	7 0	1917	do
No. 1707	do	109.80	120 0	30 0	7 0	1917	do
No. 1708	do	109.80	120 0	30 0	7 0	1917	do
No. 1710	do	109.80	120 0	30 0	7 0	1917	do
No. 1714	Line barge	40.00	60 0	20 0	3 0	1917	do
No. 7	Calking flats	4.90	38 0	14 0	2 0	1917	
No. 8	do	4.90	38 0	14 0	2 0	1917	Vicksburg, Miss.

---

[1] Formerly concrete-mixing plants.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

VICKSBURG, MISS. (THIRD MISSISSIPPI RIVER—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$4,200.00	$2,300.00	Good..		
		..do...	4,200.00	2,300.00	..do...		
		..do...	4,200.00	2,300.00	..do...	$106.33	
		..do...	4,200.00	2,300.00	..do...		
		..do...	3,650.00	1,800.00	..do...	843.41	
		..do...	3,650.00	1,800.00	..do...		
		..do...	3,650.00	1,800.00	..do...		
		..do...	3,650.00	1,800.00	..do...	925.94	
		..do...	3,650.00	1,800.00	..do...	64.36	
		..do...	3,650.00	1,800.00	..do...		
		..do...	3,650.00	1,800.00	..do...		
		..do...	3,650.00	1,800.00	..do...		
		..do...	3,650.00	1,800.00	..do...		
		..do...	850.00	350.00	..do...		
		..do...	4,998.00	3,550.00	..do...		
		..do...	4,998.00	3,550.00	..do...	65.50	
		..do...	4,998.00	3,550.00	..do...	177.70	
		..do...	4,998.00	3,550.00	..do...		
		..do...	4,998.00	3,550.00	..do...		
		..do...	4,998.00	3,550.00	..do...	170.84	
		Steel..	8,900.00	6,900.00	..do...	125.31	
		..do...	8,900.00	6,900.00	..do...		
		..do...	8,900.00	6,900.00	..do...	222.81	
		..do...	8,900.00	6,900.00	..do...		
		..do...	8,900.00	6,900.00	..do...		
		..do..	8,900.00	6,900.00	..do...		
		..do...	8,900.00	6,900.00	..do...		
		..do...	8,900.00	6,900.00	..do...		
		..do...	8,900.00	6,900.00	..do...		
		..do...	8,900.00	6,900.00	..do...		
		..do...	8,900.00	6,900.00	..do...	68.80	
		..do...	8,900.00	6,900.00	..do...		
		..do...	8,900.00	6,900.00	..do...		
		Wood.	1,446.00	900.00	..do...		
		..do...	4,750.00	3,900.00	..do...		
		..do...	4,750.00	3,900.00	..do...		
		..do...	4,750.00	3,900.00	..do...		
		..do...	4,750.00	3,900.00	..do...		
		..do...	4,750.00	3,900.00	..do...	214.02	
		..do...	4,750.00	3,900.00	..do...		
		..do...	4,395.53	4,000.00	..do...		
		..do...	4,395.53	4,000.00	..do...		
		..do...	4,395.53	4,000.00	..do...		
		..do...	4,395.53	4,000.00	..do...		
		..do...	4,049.55	3,700.00	..do...		
		..do...	4,049.55	3,700.00	..do...		
		..do...	4,049.55	3,700.00	..do...		
		..do...	4,049.55	3,700.00	..do...	19.91	
		Steel..	7,500.00	7,200.00	..do...		
		..do...	7,500.00	7,200.00	..do...		
		..do...	7,500.00	7,200.00	..do...		
		..do...	7,500.00	7,200.00	..do...		
		..do...	7,500.00	7,200.00	..do...		
		..do...	7,500.00	7,200.00	..do...		
		Wood.	60.00	10.00	Bad...		
		..do...	60.00	10.00	..do...		
		..do...	425.00	95.00	..do...		
		..do...	4,611.36	4,400.00			
		..do...	4,611.36	4,400.00			
		..do...	4,611.36	4,400.00			
		..do...	4,611.36	4,400.00			
		..do...	4,611.36	4,400.00			
		..do...	4,611.36	4,400.00			
		..do...	4,611.36	4,400.00		2.00	
		..do...	4,611.36	4,400.00			
		..do...	4,611.36	4,400.00			
		..do...	1,154.84	1,100.00	Good..	1,154.84	
		..do...	140.48	135.00	..do...		
		..do...	128.80	125.00	..do...		

TABLE 3.—*Statement of floating plant owned by the United States and*

WASHINGTON, D. C.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Talcott	Hydraulic dredge, 18-inch.	465.00	111 8	32 0	9 7	1912	Washington, N. C.
Dalecarlia	Hydraulic dredge, 12 inch.	233.30	80 0	26 0	7 0	1912	Hull, Baltimore, Md.; machinery installed by United States.
York	Snagboat	110.00	72 6	22 9	6 0	1910	Rebuilt Washington, D. C.
Castle	Tugboat	165.30	95 0	20 2	10 6	1897	Baltimore, Md
Atlas	Derrick boat	186.33	72 0	34 0	5 0	1915	Alexandria, Va.
Ana	Gasoline launch	2.50	30 3	6 6	2 5	1916	Washington, D. C.
Averill	Gasoline launch (towboat).	9.00	36 0	10 6	4 6	1916	Annapolis, Md.
Bell	Gasoline launch	.50	16 4	4 4	1 9	1912	Washington, D. C.
Relee	do	6.50	40 4	10 4	4 2	1916	do
Colonel Leach	Gasoline launch (towboat).	8.30	36 4	10 6	4 5	1913	Baltimore, Md
No. 2	Scow, deck (24 ton)	20.00	34 0	24 0	3 3	(1)	
No. 4	Scow, deck (100-ton)	55.00	72 0	26 0	6 0	1911	Alexandria, Va.
No. 5	do	55.00	72 0	26 0	6 0	1912	West Point, Va.
No. 6	Scow, deck (8-ton)	6.00	20 0	12 0	1 0	1907	Washington, D. C.
No. 7	Scow, deck (50-ton, water tank).	18.00	40 0	18 0	4 8	1913	do
No. 8	Scow, deck	18.00	40 0	18 0	4 8	1913	do
No. 9	do	35.00	50 0	20 0	5 7	1917	do
No. 10	do	35.00	50 0	20 0	5 7	1917	do
Nos. 1 to 30	Pontons	5.50	18 6	8 0	2 4	1917	do
Nos. 50 to 63	do	5.00	16 8	7 0	2 0	1917	do
Nos. 32 to 40	do	5.00	16 0	6 2	2 0	1907	do
Nos. 48	Ponton	5.00	12 8	6 0	1 10	1916	do
No. 49	do	5.00	16 8	7 0	2 0	1916	do
Nos. 41 to 47	Pontons	5.00	16 3	6 9	2 3	1915	do
No. 3	Rowboat		16 0	5 0	1 6	1913	do
No. 4	do		17 4	4 11	1 7	(2)	(2)
No. 5	do		16 0	4 6	1 4	1912	Washington, D. C.
No. 6	do		16 0	5 0	1 6	1914	do
No. 8	do		14 6	4 6	1 3	1904	do
No. 9	do		16 0	4 6	1 2	1915	do
No. 10	do		17 6	4 8	1 3	1914	West Point, Va.
No. 11	do		16 0	5 1	1 4	1915	Washington, D. C.
No. 12	do		18 2	4 7	1 7	1902	do
No. 13	do		16 0	5 1	1 4	1915	do
No. 14	do		15 11	4 5	1 9	1916	do
No. 15	do		15 0	5 2	1 8	1916	do
No. 16	do		15 0	5 4	1 6	1916	do
No. 17	do		15 9	4 8	1 6	1917	do
No. 18	do		15 0	4 2	1 2	1916	do
No. 19	do		16 0	4 0	1 3	1914	Fort Hunt, Va.
No. 20	do		16 0	4 2	1 3	1909	Salem, Ohio.
No. 21	do		18 6	5 10	2 6	(2)	(2)
No. 22	do		14 0	4 6	2 8	(2)	(2)

[1] Rebuilt, 1916.

[2] Unknown.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

WASHINGTON, D. C.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1917	Washington, D. C.	Wood.	$78,000.00	$60,000.00	Fair...	....	River and harbor work.
1911 1912	Rebuilt by United States.	...do...	18,530.00	38,000.00	Excellent.	$2,871.30	Do.
1891	Petersburg, Va..	...do...	6,129.75	7,000.00	Good..	141.53	Do.
......	Transferred from New London, Conn., 1911.	Steel..	24,973.82	20,000.00	...do...	1,115.23	Do.
......	Contract........	...do...	27,674.00	47,000.00	Excellent.	895.38	Do.
1916	Rebuilt by United States.	Wood.	425.00	500.00	...do...	6.25	Do.
......	Contract [1].......	...do...	4,080.00	4,500.00	...do...	51.31	Do.
1912	Built by United States.	...do...	378.48	270.00	Good..	3.71	Do.
1916	Norfolk, Va.....	...do...	1,506.00	1,200.00	Excellent.	149.59	Do.
......	Contract [1].......	...do...	2,397.37	2,100.00	Good..	51.01	Do.
1908	Salvaged, Washington, D.C.	...do...	(²)	5.00	Poor..	21.50	Do.
1911	Alexandria, Va..	...do...	2,511.60	2,500.00	Excellent.	60.00	
1912	West Point, Va.	...do...	2,350.00	2,350.00	...do...	....	Do.
1907	Built by United States.	...do...	225.00	100.00	Fair...	....	Do.
......	.....do..........	...do...	1,410.85	1,400.00	Excellent.	....	Do.
......	.....do..........	...do...	1,480.38	1,400.00	...do...	25.05	Do.
......	.....do..........	...do...	2,440.65	3,140.00	...do...	....	Do.
......	.....do..........	...do...	2,440.65	3,140.00	...do...	....	Do.
1917	.....do..........	...do...	[3] 131.56	150.00	...do...	....	Do.
1917	.....do..........	...do...	[3] 114.00	125.00	...do...	....	Do.
1907	.....do..........	...do...	[3] 75.52	[3] 25.00	Poor..	[3] 18.75	Do.
1916	.....do..........	...do...	49.00	60.00	Excellent.	....	Do.
1916	.....do..........	...do...	56.00	75.00	...do...	....	Do.
1915	.....do..........	...do...	[3] 104.32	[3] 115.00	Good..	....	Do.
1913	.....do..........	...do..	61.27	40.00	...do..	....	Do.
1912	Woodbridge, Va.	...do..	40.00	25.00	...do..	2.17	Do.
1912	Built by United States.	...do..	35.00	20.00	Fair...	....	Do.
1914	.....do..........	...do..	75.81	50.00	...do..	....	Do.
1904	Washington, D.C.	...do..	27.50	8.00	...do..	....	Do.
......	Built by United States.	...do..	69.50	45.00	Good..	....	Do.
......	.....do..........	...do..	55.00	20.00	Fair...	....	Do.
......	.....do..........	...do..	56.28	40.00	Good..	....	Do.
1902	.....do..........	...do..	120.00	30.00	Fair...	....	Do.
......	.....do..........	...do..	62.60	50.00	Good..	....	Do.
......	.....do..........	...do..	40.32	60.00	Excellent.	....	Do.
......	.....do..........	...do..	61.36	60.00	...do..	....	Do.
......	.....do..........	...do..	57.28	60.00	...do..	....	Do.
......	.....do..........	...do..	59.11	60.00	...do..	....	Key Bridge across Potomac River at Washington, D. C.
......	.....do..........	...do..	59.11	60.00	...do..	....	Do.
1915	Fort Hunt, Va..	...do..	25.00	25.00	Good..	....	Fortification works.
1909	Salem, Ohio.....	Steel..	45.00	....	Worthless.	....	
1911	New London, Conn.	...do..	....	75.00	Good..	....	River and harbor works.
1911	.....do..........	...do..	....	30.00	Fair...	....	Do.

[3] Each.

TABLE 3.—*Statement of floating plant owned by the United States and*

WASHINGTON, D. C.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 23	Life boat		18	8	5	7	2	3	1915	Baltimore, Md
No. A	Rowboat		16	0	4	3	1	4	1912	Great Falls, Md
No. B	do		13	6	3	8	1	3	1912	do
No. 1	Canoe		17	0	2	10	1	2	(2)	Veazie, Me
Engineer	Gasoline launch	4.00	30	0	6	6	4	3	1898	Gas Engine & Power Co., New York City.
Pontonier	Steamboat	50.00	80	0	18	0	8	0	1903	Gas Engine & Power Co. and Chas. L. Seabury & Sons Co., New York City.

WHEELING, W. VA.

Name or number.	Type.	Displacement in long tons.	Length.		Beam.		Depth.		When.	Where.
Colonel M. B. Adams	Dipper dredge	525.00	112	0	34	0	7	3	1912	Huntington, W. Va.
Addison	do	177.00	75	0	30	0	7	2	1880	Kanawha River[1]
Ravenswood	do	238.00	80	0	34	0	6	6	1902	McKeesport, Pa
Mason	Sand digger	300.00	100	0	27	0	5	6	1915	Dam No. 28, Ohio River.
Rosecrans	do	200.00	111	0	22	0	5	0	1907	Dam No. 3, Ohio River.
Captain Turtle	Derrick boat	88.00	66	9	30	0	4	6	1910	Marietta, Ohio
U. S. E. D. Wheeling No. 2.	do	170.00	74	9	35	0	4	1	[3]1914	Dam No. 28, Ohio River.
U. S. E. D. Wheeling No. 3.	do	140.00	75	0	35	0	4	7	[3]1914	do
U. S. E. D. Wheeling No. 24.	do	160.00	75	0	35	0	4	10	1910	Dam No. 26, Ohio River.
U. S. E. D. Kanawha No. 29.	do	35.00	62	0	24	0	3	8	1912	Point Pleasant, W. Va.
L. K. No. 7	do	93.00	70	0	22	0	4	10	1913	Dam No. 18, Ohio River.
U. S. E. D. Wheeling No. 43.	do	170.00	75	0	35	0	4	6	1915	Dam No. 28, Ohio River.
U. S. E. D. Wheeling No. 44.	do	160.00	75	0	35	0	4	5	1915	do
U. S. E. D. Wheeling No. 1.	Maneuver boat	101.00	60	0	26	0	3	8	1916	Ambridge, Pa
U. S. E. D. Wheeling No. 2.	do	101.00	60	0	26	0	3	8	1916	do
U. S. E. D. Wheeling No. 3.	do	101.00	60	0	26	0	3	8	1916	do
U. S. E. D. Wheeling No. 10.	do	70.00	60	0	22	0	3	8	1909	Elizabeth, Pa
U. S. E. D. Wheeling No. 11.	do	70.00	60	0	22	0	3	8	1909	do
U. S. E. D. Wheeling No. 22.	do	70 00	60	0	22	0	3	8	1910	Freedom, Pa
U. S. E. D. Wheeling No. 23.	do	70.00	60	0	22	0	3	8	1910	do
U. S. E. D. Wheeling No. 32.	do	74.00	60	0	22	2	3	8	1915	Pittsburgh, Pa
U. S. E. D. Wheeling No. 37.	do	82.00	60	0	22	0	3	8	1916	do
U. S. E. D. Wheeling No. 38.	do	82.00	60	0	22	0	3	8	1916	do
U. S. E. D. Wheeling No. 39.	do	82.00	60	0	22	0	3	8	1916	do
U. S. E. D. Wheeling No. 40.	do	82.00	60	0	22	0	3	8	1916	do
Rumsey, James	Towboat (screw)	122.00	120	0	22	0	4	3	1903	Charleston, W. Va
Crozet	Towboat (paddle)	101.00	115	0	19	0	3	0	1908	Evansville, Ind
Craighill, General	do	198.00	133	9	28	0	4	3	1911	Jeffersonville, Ind

[1] Rebuilt, 1910–11.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

WASHINGTON, D. C.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1915	Baltimore, Md..	Steel..	$115.00	$115.00	Good..	....	River and harbor works.
......	....	Wood.	24.00	24.00	Fair...	....	Washington Aqueduct.
......	....	...do..	24.00	24.00	...do..	....	Do.
1911	Washington, D.C.	...do..	35.00	20.00	Good..	....	River and harbor works.
1898	New York City..	...do..	1,800.00	175.00	Very poor.	....	Instruction of Engineer troops at Engineer School, Washington Barracks D. C.
1903	.....do..........	...do..	18,750.00	8,100.00	Good..	$1,009.45	Do.

WHEELING, W. VA.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
......	....	Steel..	$44,577.86	$26,000.00	Good..	$3,977.65	Ohio River improvement.
......	....	Wood.	14,000.00	8,000.00	...do..	993.87	Kanawha River improvement.
1915	Ravenswood, W. Va.	...do..	23,000.00	10,000.00	Poor..	6,155.18	Ohio River improvement.
......	....	...do..	17,169.09	12,000.00	Good..	2,380.25	Do.
1910	Dam No. 26, Ohio River.	...do..	12,000.00	2,500.00	Poor..	3,280.57	Do.
......	....	...do..	8,200.00	4,500.00	Good..	19.66	Kanawha River improvement.
1908	Parkersburg, W. Va.	...do..	[2] 9,106.48	5,000.00	...do..	4,953.65	Ohio River improvement.
1908	.....do..........	...do..	[2] 11,026.61	7,500.00	...do..	1,468.60	Do.
......	....	...do..	9,875.95	2,750.00	Fair...	1,430.42	Do.
......	....	...do..	1,912.00	800.00	Good..	....	Kanawha River improvement.
......	....	...do..	4,910.66	3,500.00	...do..	1,764.50	Little Kanawha River improvement.
......	....	...do..	10,780.88	7,000.00	...do..	2,602.58	Ohio River improvement.
......	....	...do..	11,235.75	8,000.00	...do..	1,331.09	Do.
......	....	Steel..	13,879.03	13,000.00	...do..	....	Do.
......	....	...do..	13,935.72	13,000.00	...do..	....	Do.
......	....	...do..	13,912.82	13,000.00	...do..	....	Do.
......	....	Wood.	5,104.35	1,600.00	Fair...	647.53	Do.
......	....	...do..	6,200.00	2,200.00	...do..	82.11	Do.
......	....	...do..	5,200.00	1,900.00	Good..	8.00	Do.
......	....	...do..	5,200.00	2,300.00	Fair...	....	Do.
......	....	Steel..	8,820.25	8,000.00	Good..	42.84	Do.
......	....	...do..	8,583.11	8,000.00	...do..	57.24	Do.
......	....	...do..	8,583.11	8,000.00	...do..	....	Do.
......	....	...do..	8,583.11	8,000.00	...do..	....	Do.
......	....	...do..	8,583.11	8,000.00	...do..	95.05	Do.
......	....	...do..	30,942.00	14,000.00	...do..	245.12	Kanawha River improvement.
1915	Evansville, Ind.	Wood.	8,500.00	4,000.00	Poor..	5,191.38	Ohio River improvement.
......	....	Steel..	27,550.00	13,000.00	Good..	3,437.79	Do.

[2] Rebuilt, 1914, at Dam No. 28, Ohio River; originally purchased secondhand in 1908 at $2,000 each.

TABLE 3.—*Statement of floating plant owned by the United States and*

WHEELING, W. VA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Benwood	Gasoline launch (screw)	20.00	26 0	6 0	3 0	1917	Salem, Ohio
Monroe	do	4.00	40 0	8 6	4 0	1913	Bay City, Mich
Nanina	do	6.00	42 5	7 5	3 11	1911	Louisville, Ky
Tiskelwah	do	.83	22 0	5 8	2 7	1917	Salem, Ohio
U. S. E. D. Wheeling No. 33.	Gasoline launch (motor)	1.50	22 0	5 10	1 10	1914	Pittsburgh, Pa
U. S. E. D. Wheeling No. 34.	do	1.50	22 0	5 10	1 10	1914	do
U. S. E. D. Wheeling No. 36.	do	1.90	22 0	5 10	1 10	1914	do
Alto	Gasoline launch (paddle).	30.00	76 0	16 0	1 6	1916–17	Dam No. 21, Ohio River.
Glenville	do	10.00	53 0	9 0	3 0	1912	Grafton, Ill
U. S. E. D. Kanawha No. 28.	Quarterboat	33.00	65 0	20 0	3 9	1910	Marietta, Ohio
U. S. E. D. Kanawha No. 27.	Dump boat (side)	32.00	58 0	20 0	5 9	1906	Point Pleasant, W. Va.
U. S. E. D. Kanawha No. 33.	do	32.00	58 0	20 0	5 9	1915	do
U. S. E. D. Kanawha No. 34.	do	32.00	58 0	20 0	5 9	1915	do
U. S. E. D. Wheeling No. 27.	Dump scow	110.00	80 0	22 0	6 5	1912	Pittsburgh, Pa
U. S. E. D. Wheeling No. 28.	do	110.00	80 0	22 0	6 5	1912	do
U. S. E. D. Wheeling No. 41.	do	60.00	70 4	20 9	6 9	1914	Parkersburg, W. Va.
U. S. E. D. Wheeling No. 42.	do	60.00	70 4	20 9	6 9	1914	do
U. S. E. D. Wheeling No. 6.	Flatboat	10.00	40 0	12 0	3 2	1911	Dam No. 11, Ohio River.
U. S. E. D. Wheeling No. 7.	do	36.00	90 0	16 0	4 4	1909	Dam No. 26, Ohio River.
U. S. E. D. Wheeling No. 8.	Flatboat (half-decked)	33.00	75 0	16 0	4 1	1909	do
U. S. E. D. Wheeling No. 9.	do	33.00	75 0	16 0	4 1	1909	do
U. S. E. D. Wheeling No. 13.	Barge (decked)	80.00	100 0	22 0	4 11	1912	Pittsburgh, Pa
U. S. E. D. Wheeling No. 14.	do	80.00	100 0	22 0	4 11	1912	do
U. S. E. D. Wheeling No. 1.	Flatboat	10.00	40 0	12 0	3 2	1916	Dam No. 13, Ohio River.
U. S. E. D. Wheeling No. 2.	do	10.00	40 0	12 0	3 2	1916	do
U. S. E. D. Wheeling No. 3.	do	10.00	40 0	12 0	3 2	1916	do
U. S. E. D. Wheeling No. 15.	do	60.00	90 0	16 0	4 7	1910	Dam No. 26, Ohio River.
U. S. E. D. Wheeling No. 16.	do	60.00	90 0	16 0	4 7	1910	do
U. S. E. D. Wheeling No. 17.	do	60.00	90 0	16 0	4 7	1910	do
U. S. E. D. Wheeling No. 18.	do	60.00	90 0	16 0	4 7	1910	do
U. S. E. D. Wheeling No. 19.	do	10.00	40 0	14 0	3 0	1910	Dam No. 13, Ohio River.
U. S. E. D. Wheeling No. 25.	do	50.00	75 0	16 0	4 1	1911	Dam No. 26, Ohio River.
U. S. E. D. Wheeling No. 26.	do	50.00	75 0	16 0	4 1	1911	do
U. S. E. D. Wheeling No. 29.	do	10.00	40 0	12 0	2 4	1911	Point Pleasant, W. Va.
U. S. E. D. Wheeling No. 30.	Barge (decked)	83.00	80 0	30 0	5 4	1908	St. Louis, Mo
U. S. E. D. Wheeling No. 31.	do	83.00	80 0	30 0	5 4	1910	do
U. S. E. D. Wheeling No. 35.	Flatboat (decked)	16.00	50 0	15 0	3 4	1914	Dam No. 18, Ohio River.
U. S. E. D. Wheeling No. 45.	Pump boat	292.00	100 0	30 0	5 1	1915	Dam No. 28, Ohio River.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

WHEELING, W. VA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1917	Salem, Ohio....	Steel..	$2,074.00	$2,000.00	Good..	$13.38	Ohio River improvement.
1913	Bay City, Mich.	Wood.	3,058.88	500.00	Poor..	158.99	Do.
......	....	...do..	3,069.53	600.00	Good..	7.60	Kanawha River improvement.
1917	Salem, Ohio.....	Steel..	1,369.44	1,100.00	...do..	47.99	Do.
1914	Pittsburgh, Pa..	Wood.	381.87	40.00	Poor..	131.99	Ohio River improvement.
1914	.....do...........	...do...	355.00	150.00	Good..	7.50	Do.
1914	.....do...........	...do...	405.16	100.00	Fair...	124.85	Do.
......	....	...do...	6,278.16	1,500.00	Burned	304.45	Do.
......	....	Steel..	2,679.15	1,100.00	Fair...	140.68	Little Kanawha River improvement.
......	....	Wood.	2,000.00	800.00	Good..	....	Kanawha River improvement.
......	....	...do...	1,850.00	....	Worthless.	....	Do.
......	....	...do...	2,625.00	1,800.00	Good..	....	Do.
......	....	...do...	2,625.00	1,800.00	...do...	....	Do.
......	....	...do...	5,910.00	2,300.00	...do...	72.74	Ohio River improvement.
......	....	...do...	5,910.00	2,300.00	...do...	57.52	Do.
1915	Ravenswood, W. Va.	Wood.	3,500.00	2,000.00	Fair...	88.49	Do.
1915	.....do...........	...do...	3,500.00	2,000.00	...do...	88.49	Do.
......	....	Wood.	284.42	150.00	Good..	....	Do.
......	....	...do...	799.00	50.00	Poor..	215.68	Little Kanawha River.
......	....	...do...	654.00	....	Worthless.	42.35	Ohio River improvement.
......	....	...do...	654.00	125.00	Poor..	21.25	Do.
......	....	...do...	3,050.00	1,100.00	Fair...	159.05	Do.
......	....	...do...	3,050.00	1,100.00	...do...	423.88	Do.
......	....	...do...	304.13	250.00	Good..	....	Do.
......	....	...do...	304.13	250.00	...do...	....	Do.
......	....	...do...	357.87	250.00	...do...	....	Do.
......	....	...do...	1,000.00	150.00	Fair...	49.48	Do.
......	....	...do...	1,000.00	500.00	Bad...	200.00	Do.
......	....	...do...	1,000.00	....	...do...	150.00	Do.
......	....	...do...	1,000.00	200.00	Poor..	11.12	Do.
......	....	...do...	400.00	125.00	Fair...	41.87	Do.
......	....	...do...	845.39	50.00	Bad...	160.00	Do.
......	....	...do...	845.39	75.00	...do...	155.00	Do.
......	....	...do...	325.00	150.00	Fair...	....	Do.
1913	Kenova, W. Va.	Wood.	1,000.00	250.00	...do...	1,572.05	Do.
1913	.....do...........	..do ...	1,000.00	250.00	...do...	39.67	Do.
......	....	Wood.	546.58	300.00	Good..	11.75	Do.
......	....	...do...	10,252.13	6,000.00	Poor..	3,104.99	Do.

TABLE 3.—*Statement of floating plant owned by the United States and*

WHEELING, W. VA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
U. S. E. D. Wheeling No. 46.	Pump boat	222.00	100	0	30	0	5	1	1915	Dam No. 22, Ohio River.
U. S. E. D. Wheeling No. 47.	Flatboat (decked)	80.00	90	0	20	0	4	9	1915	Dam No. 28, Ohio River.
U. S. E. D. Wheeling No. 48.	do	80.00	90	0	20	0	4	9	1915	do
U. S. E. D. Wheeling No. 49.	do	80.00	90	0	20	0	4	9	1915	do
U. S. E. D. Wheeling No. 50.	do	80.00	90	0	20	0	4	9	1915	do
U. S. E. D. Wheeling No. 51.	do	80.00	90	0	20	0	4	9	1915	do
U. S. E. D. Wheeling No. 52.	do	80.00	90	0	20	0	4	9	1915	do
U. S. E. D. Wheeling No. 53.	do	80.00	90	0	20	0	4	9	1915	Dam No. 22, Ohio River.
U. S. E. D. Wheeling No. 54.	do	80.00	90	0	20	0	4	9	1915	do
U. S. E. D. Wheeling No. 55.	do	80.00	90	0	20	0	4	9	1915	do
U. S. E. D. Wheeling No. 56.	do	80.00	90	0	20	0	4	9	1915	do
U. S. E. D. Wheeling No. 57.	do	80.00	90	0	20	0	4	9	1915	do
U. S. E. D. Wheeling No. 58.	Flatboat	10.00	40	0	12	0	3	0	1915	Dam No. 11, Ohio River.
U. S. E. D. Wheeling No. 59.	do	10.00	40	0	12	0	3	2	1915	do
U. S. E. D. Wheeling No. 60.	do	10.00	40	0	12	0	3	2	1915	Dam No. 13, Ohio River.
U. S. E. D. Wheeling No. 61.	do	10.00	40	0	12	0	3	0	1915	do
U. S. E. D. Wheeling No. 62.	do	10.00	40	0	12	0	3	2	1915	do
U. S. E. D. Wheeling No. 63.	Concrete-mixer boat	480.00	90	0	40	0	7	1	1916	Dams Nos. 21 and 22, Ohio River.
U. S. E. D. Wheeling No. 64.	Flatboat	80.00	90	0	20	0	5	0	1916	do
U. S. E. D. Wheeling No. 65.	do	80.00	90	0	20	0	5	0	1916	do
U. S. E. D. Wheeling No. 66.	do	92.00	100	0	22	0	5	0	1916	do
U. S. E. D. Wheeling No. 67.	do	92.00	100	0	22	0	5	0	1916	do
U. S. E. D. Kanawha No. 30.	Flatboat (decked)	35.00	70	0	18	0	3	8	1912	Point Pleasant, W. Va.
U. S. E. D. Kanawha No. 31.	do	35.00	70	0	18	0	3	8	1912	do
U. S. E. D. Kanawha No. 32.	Flatboat	20.00	80	0	18	0	4	3	1912	do
No. 4A2	Derrick service boat	30.00	59	0	20	0	2	4	1908	Charleston, W. Va.
No. 5A2	do	30.00	59	0	20	0	2	4	1912	do
No. 6A2	do	30.00	59	0	20	0	2	4	1907	do
No. 7A2	do	30.00	59	0	20	0	2	4	1911	do
No. 9A2	do	30.00	59	0	20	0	2	4	1908	do
N0. 6A3	do	30.00	59	0	20	0	2	4	1916	Dam No. 22, Ohio River.
No. 8A3	do	30.00	59	0	20	0	2	4	1912	Charleston, W. Va.
No. 9A3	do	30.00	59	0	20	0	2	4	1916	Dam No. 22, Ohio River.
No. 10A3	do	30.00	59	0	20	0	2	4	1915	Elizabeth, Pa.
No. 11A3	do	30.00	59	0	20	0	2	4	1914	Point Pleasant, W. Va.
No. 2B2	Service boat	4.00	40	0	7	4	2	1	1908	Charleston, W. Va.
No. 3B2	do	4.00	40	0	7	4	2	1	1908	do
No. 4B2	do	4.00	40	0	7	4	2	1	1903	do

[1] Rebuilt, 1910–11.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

WHEELING, W. VA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$14,620.71	$12,750.00	Good..	$2,941.47	Ohio River improvement.
		do.	1,906.66	1,100.00	do.	66.25	Do.
		do.	1,867.56	800.00	Fair...	199.00	Do.
		do.	1,906.66	1,100.00	Good..	65.84	Do.
		do.	1,867.56	800.00	Fair...	200.00	Do.
		do.	1,867.56	800.00	do.	200.00	Do.
		do.	1,867.56	800.00	do.	197.61	Do.
		do.	1,906.66	1,100.00	Good..	98.90	Do.
		do.	1,906.66	1,100.00	do.	56.37	Do.
		do.	1,906.65	1,100.00	do.	38.97	Do.
		do.	1,906.65	1,100.00	do.	79.88	Do.
		do.	1,906.65	1,100.00	do.	159.17	Do.
		do.	270.00	175.00	do.	10.90	Do.
		do.	270.00	175.00	do.	10.44	Do.
		do.	384.00	250.00	do.		Do.
		do.	384.00	250.00	do.		o.
		do.	384.00	250.00	do.		Do.
		do.	33,975.69	25,000.00	do.	5,801.20	Do.
		do.	2,843.04	2,200.00	do.	40.00	Do.
		do.	2,843.04	2,200.00	do.	50.00	Do.
		do.	2,950.90	2,300.00	do.	35.00	Do.
		do.	2,950.90	2,300.00	do.	50.00	Do.
		do.	1,050.00	500.00	do.		Kanawha River improvement.
		do.	1,050.00	500.00	do.		Do.
		do.	1,265.00	650.00	do.		Do.
		do.	900.00	100.00	do.		Do.
		do.	900.00	400.00	do.		Do.
		do.	750.00		Worthless.		Do.
		do.	920.00	300.00	Good..		Do.
		do.	900.00		Worthless.		Do.
		do.	1,203.25	1,200.00	Good..		Do.
		do.	900.00	400.00	do.		Do.
		do.	1,203.25	1,200.00	do.		Do.
		do.	932.50	650.00	do.		Do.
		do.	902.34	550.00	do.		Do.
		do.	200.00	20.00	Poor..		Do.
		do.	200.00	20.00	do.		Do.
		do.	190.00		Worthless.		Do.

---

[3] Rebuilt 1914 at Dam No. 28, Ohio River; originally purchased secondhand in 1908 at $2,000 each.

TABLE 3.—*Statement of floating plant owned by the United States and*

WHEELING, W. VA.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.						Built.	
			Length.		Beam.		Depth.		When.	Where.
			Ft.	*in.*	*Ft.*	*in.*	*Ft.*	*in.*		
No. 6B2	Service boat	4.00	40	0	7	4	2	1	1913	Lock No. 6, Kanawha River.
No. 7B2	do	4.00	40	0	7	4	2	1	1910	Lock No. 7, Kanawha River.
No. 8B2	do	4.00	40	0	7	4	2	1	1910	Lock No. 8, Kanawha River.
No. 9B	do	4.00	40	0	7	4	2	1	1898	Montgomery, W. Va.
No. 10B2	do	4.00	40	0	7	4	2	1	1909	Lock No. 10, Kanawha River.
No. 11B2	do	4.00	40	0	7	4	2	1	1910	Lock No. 11, Kanawha River.
No. 4B3	do	4.00	40	0	7	4	2	1	1916	Dam No. 22, Ohio River.
No. 5B3	do	4.00	40	0	7	4	2	1	1914	Point Pleasant, W. Va.
WILMINGTON, DEL.										
Gannet	Gasoline cruiser (survey or inspection boat).	20.00	72	0	12	6	5	2	1907	Qunicy Point, Mass.
No. 1	Launch (power tender).		14	2½	4	0	2	0	1907	do
Hinda	Gasoline launch	1.80	28	0	7	6	4	3½	1907	Morris Heights, N. Y.
Absecon	Seagoing hopper dredge.	994.00	161	10	36	6	12	0	1914	Baltimore, Md
Absecon	Launch (power tender).		20	0	6	6	3	0	1914	Holly Oak, Del
Minquas	Seagoing hopper dredge.	1,105.00	152	0	30	0	12	0	1915	Baltimore, Md
Minquas	Launch (power tender).		18	2	6	3½	2	8½	1915	Holly Oak, Del
Uncle Sam	Pipe line hydraulic dredge.	450.00	85	0	34	0	7	0	1899	Jersey City, N. J
WILMINGTON, N. C.										
Cape Fear	Seagoing hopper dredge.	480.00	131	3	29	0	12	0	1895	Philadelphia, Pa
Bacon, Henry[3]	Pipe line hydraulic dredge.	1,410.00	150	6	39	0	15	0	1907	Westlake, La
Croatan[5]	do	235.00	80	0	23	6	8	0	1911	Camden, N. J
Ajax	Clamshell dredge	400.00	82	0	32	8	10	4	1884	Port Royal, S. C.
Hercules	do	670.00	100	0	38	0	11	4	1907	Jersey City, N. J
Scuppernong	do	186.00	78	0	32	0	7	0	1904	Newbern, N. C
Wright, Gen. H. G	Snag boat	130.00	101	6	25	0	5	6	[4] 1882	Wilmington, N. C
Black	Derrick boat	35.00	45	0	20	0	4	0	1910	do
Contentnea	do	32.00	40	0	20	0	4	0	1911	Newbern, N. C
Lilliput	Pile driver	82.00	60	0	24	0	5	1	1903	Wilmington, N. C
Mercur[5]	Steam launch	60.00	83	0	13	3	7	0	1892	City Island, N. Y
Caswell, Richard	Tugboat	200.00	84	9	18	6	10	0	1900	Baltimore, Md

[1] This launch included in purchase price of Gannet.

[2] This launch included in contract price of dredge.

[3] Formerly the No. 9.

[4] Including plant.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

WHEELING, W. VA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	$121.00	$60.00	Good..		Kanawha River improvement.
		...do...	106.00	10.00	Poor..		Do.
		...do...	105.00	10.00	...do...		Do.
		...do...	107.00		Worthless.		Do.
		...do...	117.00	10.00	Poor..		Do.
		...do...	110.00	10.00	...do...		Do.
		...do...	293.50	240.00	Good..		Do.
		...do...	235.33	100.00	...do...		Do.

WILMINGTON, DEL.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
1910	Wilmington, Del.	Wood.	$11,000.00	$10,000.00	Good..	$1,032.17	River and harbor improvements and fortifications in the Wilmington, Del., district.
1910	do.	...do...	Unknown [1]	145.00	...do...		Do.
1907	Morris Heights, N. Y.	...do...	2,600.00	1,000.00	...do...	124.66	Improving Wilmington Harbor, Del., and on fortification work at Fort Saulsbury, Del.
		Steel..	178,949.23	161,054.30	...do...	8,353.96	Improving Absecon and Cold Spring Inlets, N. J.
		Wood.	825.00	625.00	...do...	6.20	Do.
		Steel..	193,939.52	174,545.57	...do...	2,675.93	Improving Wilmington Harbor, Del.
		Wood.	(2)	600.00	...do...	18.70	Do.
1904	Jersey City, N. J.	...do...	18,856.94	6,000.00	Unserviceable.		Laid up.

WILMINGTON, N. C.

When.	Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
		Wood.	$60,809.30	$35,000.00	Poor..	$3,429.49	Improving Cape Fear River, N. C., at and below Wilmington.
1914	Wilmington, N. C.	...do...	[4] 124,000.00	90,000.00	Good..	605.40	Do.
		...do...	32,000.00	32,000.00	...do...	2,644.73	Improving rivers and harbors, Newbern, N. C., subdistrict.
1897	Charleston, S. C.	...do...	16,050.00	15,000.00	Fair...	178.60	Improving Cape Fear River, N. C., at and below Wilmington.
1907	JerseyCity, N.J.	...do...	61,350.00	33,000.00	...do...	812.16	Do.
		...do...	10,300.00	7,000.00	Poor..		Improving rivers and harbors, Newbern, N. C. subdistrict.
		...do...	3,000.00	3,500.00	Fair...	169.37	Improving Northeast, Black and Cape Fear Rivers, N. C.
		...do...	1,399.16	800.00	Good..	414.73	Do.
		...do...	3,000.00	2,250.00	...do...	592.78	Improving rivers and harbors, Newbern, N. C., subdistrict.
		...do...	[7] 1,485.00	Nothing.	Worthless.		Improving Cape Fear River, N. C., at and below Wilmington.
1899	New York, N. Y	Steel..	11,000.00	5,000.00	Poor..	231.95	Do.
		...do...	26,500.00	25,000.00	Good..	1,267.73	Do.

[5] Formerly the dredge Miller.

[6] Rebuilt in 1910, Wilmington, N. C.

[7] Hull only.

[8] Formerly the Mary Lily.

TABLE 3.—*Statement of floating plant owned by the United States and*

WILMINGTON, N. C.—Continued.

Name or number.	Type.	Displacement in long tons.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
			Ft. in.	*Ft. in.*	*Ft. in.*		
Coquet	Tugboat	100.00	63 0	18 6	7 0	1906	Madison, Md
Cynthia	do	135.00	74 7	17 10	7 10	1891	Baltimore, Md
Frances	Gasoline launch	7.00	43 0	7 10	4 0	1906	Muskegon, Mich
Olive	do	5.00	34 0	8 0	3 2	1892	Morris Heights, N.Y.
Nancy	do	7.75	30 0	7 0	2 0	[1] 1903	New York, N. Y
Polly	do	2.00	16 0	4 6	2 6	1898	Derby, Conn
Spry	do	2.00	18 6	5 4	3 8		
Faber	do	10.00	42 0	10 0	4 0	1897	Berwick, La
Neuse	do	34.60	62 5	15 0	14 3	1915	Morehead City, N. C.
John Krey	do	7.00	35 5	8 0	5 0	1913	Muskegon, Mich
Manteo	do	37.00	52 0	13 8	8 0	1917	Winthrop Harbor, Ill.
Rocks	do	5.00	26 0	7 3	4 0	1908	Southport, N. C
Beaufort	Quarter boat	15.00	50 0	18 3	2 8	1908	
No. 4	do	16.00	53 0	15 0	2 9		New River, N. C
D and E (scows)	Dump scow	135.00	91 8	26 0	10 0	1907	Jacksonville, Fla
F and G (scows)	do	225.00	125 0	32 0	10 0	1908	Baltimore, Md
L	Deck scow	20.00	30 0	16 0	4 0	1912	Newbern, N. C
1 (one)	do	60.00	75 0	20 0	5 0	1895	Wilmington, N. C
2	do	60.00	75 0	20 0	5 0	1896	do
3	do	65.00	75 8	20 0	5 6	1903	do
4	do	65.00	75 8	20 0	5 6	1903	do
5 and 6 (2 scows)	do	65.00	75 8	20 6	5 6	1907	do
7	do	15.00	30 0	15 0	4 0	1903	Newbern, N. C
9	do	65.00	74 6	20 6	5 6	1913	Wilmington, N. C
C	do	130.00	84 8	26 0	10 3	1897	do
B-10	do	60.00	70 0	20 6	6 0	1912	Jacksonville, Fla
B-11	do	65.00	74 0	24 6	6 0	1912	do
11	do	55.00	71 0	23 0	6 6	1913	Wilmington, Del

[1] Rebuilt at Morehead City, N. C., in 1913.

[2] Included in cost of Dredge Henry Bacon.

employed in the Engineer Department at large on Dec. 31, 1917—Continued.

WILMINGTON, N. C.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1907	Baltimore, Md..	Wood.	$8,000.00	$5,000.00	Fair...	$119.15	Improving various rivers and harbors, Wilmington, N. C.
1897	Charleston, S. C.	...do...	8,500.00	10,000.00	...do...	268.57	Improving Cape Faer River, N. C., at and below Wilmington.
1908	Beaufort, N. C..	...do...	600.00	1,000,00	...do...	79.25	Improving rivers and harbors, Newbern, N. C., subdistrict.
1905	Wilmington, N. C.	...do ..	1,700.00	600.00	...do...	93.00	Do.
......	....	...do...	2,065.25	1,000.00	Good..	126.28	Improving Cape Fear River, N. C., at and below Wilmington.
......	....	...do...	550.00	50.00	Fair...	16.42	Gun and mortar batteries.
......	....	...do...	....	75.00	...do...	....	Improving Cape Fear River, N. C., at and below Wilmington.
1914	Wilmington, N. C.	...do..	(3)	1,500.00	...do...	131.47	Do.
1915	Morehead City, N. C.	...do...	10,129.06	10,000.00	Good..	302.76	Improving rivers and harbors, Newbern, N. C., subdistrict.
1913	Muskegon, Mich.	...do...	2,525.00	1,250.00	Fair...	75.46	Improving Cape Fear River, N. C., above Wilmington.
1917	Winthrop Harbor, Ill.	...do...	[3] 19,000.00	20,000.00	New..	....	Improving rivers and harbors, Newbern, N. C., subdistrict.
1913	Wilmington, N. C.	...do...	300.00	150.00	Fair...	114.65	Improving Cape Fear River, N. C., at and below Wilmington.
......	....	...do...	400.00	30.00	Poor..	....	Improving rivers and harbors, Newbern, N. C., subdistrict.
1914	Wilmington, N. C.	...do...	650.00	50.00	...do...	....	Improving Cape Fear River, N. C., above Wilmington.
......	....	...do...	[4] 16,500.00	3,500.00	...do...	22.11	Improving Cape Fear River, N. C., at and below Wilmington.
......	....	...do...	[4] 30 650.00	5,000.00	...do...	....	Do.
......	....	...do...	500.00	300.00	Fair...	....	Improving rivers and harbors, Newbern, N. C., subdistrict.
......	....	...do...	1,000.00	200.00	Poor..	13.71	Improving Cape Fear River, N. C., above Wilmington.
......	....	...do ..	1,000.00	....	...do...	19.62	Improving Cape Fear River, N. C., at and below Wilmington.
......	....	...do...	1,485.00	250.00	...do...	14.88	Do.
......	....	...do...	1,485.00	400.00	Fair..	13.60	Do.
......	....	...do...	[4] 4,450.00	500.00	Good.. Poor..	74.61	Do.
......	....	...do...	800.00	50.00	Poor..	....	Improving rivers and harbors, Newbern, N. C., subdistrict.
......	....	...do...	2,484.62	2,000.00	Good..	163.61	Improving Cape Fear River, N. C., above Wilmington.
......	....	...do...	5,620.00	1,000.00	Poor..	81.16	Improving Cape Fear River, N. C., at and below Wilmington.
1914	Wilmington, N. C.	...do...	(3)	750.00	Good..	....	Do.
1914	.....do..........	...do...	(3)	650.00	...do...	....	Do.
1915	Newbern, N. C..	...do...	(5)	1,800.00	Fair...	5.70	Improving rivers and harbors, Newbern, N. C., subdistrict.

---

[3] Estimated. [4] For two. [5] Included in cost of dredge Croatan.

TABLE 4.

SEAGOING HOPPER DREDGES.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917.*

Name	*Absecon.*
1. District to which dredge belongs	Wilmington, Del.
2. Where built	Baltimore, Md.
3. When built	1914.
4. Builder	Ellicott Machine Corporation.
5. Contract cost	$174,137.78.
6. Cost of outfit	$4,811.45.
7. Total first cost	$178,949.23.
8. Present value	$161,054.30.
9. Time to build	14 months 20 days.
10. Material of hull	Steel.
11. Length over all	161 feet 10 inches.
12. Length between perpendiculars	150 feet.
13. Beam	36 feet 6 inches.
14. Depth amidship	12 feet.
15. Drafts, light:	
(a) Forward	5 feet 4 inches.
(b) Aft	7 feet 8 inches.
16. Drafts, loaded:	
(a) Forward	10 feet.
(b) Aft	9 feet 9 inches.
17. Displacement:	
(a) Light	560 tons.
(b) Loaded	994 tons.
18. Number of hoppers	Two.[2]
19. Total capacity of hoppers	300 cubic yards.
20. Number of drags	One.[1]
21. Type of drag	Standard cast steel.
22. Number, size, and type of—	
(a) Dredging pumps	One 15-inch centrifugal.
(b) Pumping engines	One 12 and 24 by 14 inch stroke, compound.
23. Revolutions per minute of pumping engines	175.
24. Total indicated horsepower of pumping engines	270.
25. Number, size, and type of propelling engines	Two 12 and 24 by 14 inch stroke, compound.
26. Revolutions per minute of propelling engines:	
(a) Light	120.
(b) Loaded	115.
(c) While dredging	40.
27. Total indicated horsepower of propelling engines	550.
28. Average speed:	
(a) Light	9 knots.
(b) Loaded	8 knots.
(c) While dredging	2 knots.
29. Number and type of boilers	Two Almy water-tube boilers, class E.
30. Dimensions of boilers:	
(a) Diameter	8 feet 11 inches.
(b) Length	7 feet 5 inches.
(c) Heating surface (total)	3,600 square feet.
(d) Grate surface (total)	95 square feet.

31. Boiler pressure (gauge)	150 pounds.								
32. Number of men in crew	21.								
33. Number of men required to operate dredge with single crew.	21.								
OPERATIONS.	OPERATION.			OPERATION.			OPERATION.		
34. Location of dredging	Absecon Inlet, N. J			Cold Spring Inlet, N. J.			Delaware River above Philadelphia.		
35. Depth at mean low water before dredging	14.5 feet			18 to 20 feet			9.8 feet.		
36. Depth at mean low water after dredging	15 feet			25 feet			10.5 feet.		
37. Character of dredging material	Sea sand			Sea sand			Gravel, sand, and mud.		
38. Total number of miles run by dredge from work to dump, while loaded only, during year.	954.1			76			397½.		
39. Total number of loads dredged during year	737			76			245.		
40. Average distance from work to dump per load	1.26 miles			1.2 miles			1.6 miles.		
41. Average number of loads dredged daily (counting days worked).	6.3			3.2			6.		
42. Maximum amount in cubic yards dredged in one day	4,290			1,650			3,600.		
43. Maximum amount in cubic yards per load	330			330			330.		
44. Average amount in cubic yards per load	328.4			319.1			326.		
45. Average amount in cubic yards dredged per hour pumping=Item 27÷Item 50a.	405.6			169.3			340.		
46. Maximum amount in cubic yards dredged per hour pumping.	660			600			350.		
47. Total amount in cubic yards dredged during year	241,995*			24,250			79,980.		
48. Maximum amount in cubic yards dredged in one month.	44,110			12,770			46,470.		
49. Total amount in cubic yards dredged by this dredge in this locality.	655,930			145,175			79,980.		
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:									
(a) Pumping	596	36	9.75	143	13	11.48	235	31	16.35
(b) Turning in cut	102	24	1.67	28	18	2.26	34	35	2.40
(c) To and from dump	185	59	3.04	12	40	1.02	126	17	8.77
(d) Dumping	42		.69	4	9	.33	22	20	1.55
(e) Taking fuel and supplies	268	6	4.38	12	22	1.00	66	2	4.59
(f) To and from wharf and anchorage	157	20	2.57	13	48	1.11	16	44	1.16
51. Time lost from work:									
(a) Bad weather	1,115	40	18.23	209	55	16.82	99	25	6.90
(b) Ordinary repairs	141	30	2.31	56	30	4.53	46	55	3.26
(c) Extraordinary repairs	70	30	1.15				94		6.53
(d) Alterations and additions									
(e) Out of commission									
(f) Lying at berths nights and after working hours	2,409	45	39.37	506	30	40.59			
(g) Transferring from one district to another							52		3.61
(h) Miscellaneous	35	15	.58	68	35	5.48	334	11	26.82
(i) Sundays and holidays	994	55	16.26	192		15.38	312		21.67
52. Total number of hours in year	8,760		100.00	8,760		100.00	8,760		100.00
53. Total time at work	1,352	25		214	30		501	29	
54. Total time lost from work (exclusive of Sundays, holidays, and transfers, Item [51—(g+i].	3,772	40		841	30		626	31	

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name.	*Absecon.*					
55. Number of days upon which any dredging was done.	117.		24.		38.	
56. Average number of working hours per day.	11 hours 30 minutes.		8 hours 55 minutes.		13 hours 12 minutes.	
57. Maximum number of working hours per day.	16 hours 30 minutes.		12 hours 30 minutes.		16 hours.	
58. Average time to dredge 1 load.	48.6 minutes.		1 hour 53 minutes.		58 minutes.	
59. Average time to dump 1 load.	3.42 minutes.		3.27 minutes.		5 minutes.	
60. Average time spent going to and from dump.	15 minutes.		10 minutes.		52 minutes.	
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll.	$13,956.08	35.83	$2,652.00	31.34	$3,511.62	26.72
62. Coal.	6,810.16	17.49	1,683.45	19.89	1,697.70	12.91
63. Fuel oil.						
64. Water.			11.70	.14	4.63	.04
65. Supplies:						
(*a*) Subsistence.	3,872.41	9.94	747.38	8.83	1,174.32	8.93
(*b*) Engine room.	1,216.75	3.12	44.90	.53	45.67	.35
(*c*) Miscellaneous.	902.08	2.32	29.28	.35	48.81	.37
66. Renewals of or additions to outfit.	767.69	1.97				
67. Ordinary repairs:						
(*a*) Hull.	11.46	.03			12.69	.10
(*b*) Machinery.	343.01	.88	343.70	4.06		
68. Extraordinary repairs:						
(*a*) Hull.	2,139.39	5.50				
(*b*) Machinery.	4,748.71	12.20				
69. Alterations and additions:						
(*a*) Hull.						
(*b*) Machinery.						
70. Laundry and miscellaneous expenses, wharfage, etc.	2,247.63	5.77	127.47	1.50	34.38	.26
71. Office expense.	105.89	.27	91.07	1.08	836.85	6.37
72. Surveys and superintendence.	1,821.59	4.68	311.30	3.68	2,983.07	22.69
73. Rental.			2,420.00	28.60	2,795.00	21.26
Total cost.	38,942.85	100.00	8,462.25	100.00	13,144.74	100.00
74. Operating cost for year.	$29,772.80.		$7,716.18.		$9,312.13.	
75. Cost per hour of time at work. Item 74÷Item 53.	$22.01.		$35.97.		$18.56.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.	$83,036.47.		$37,175.		$11,627.84.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.	12.3.		31.8.		11.	
78. Average number of cubic yards dredged per hour of time at work—Item 47÷Item 53.	178.9.		113.05.		159.	

79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69)]+Item 47.	13.1	33.5	16.4.
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69)]+Item 47.	13.2	34.8	16.4.
81. Gross cost per cubic yard (cents). Total cost+Item 47.	16.1	34.8	16.43.
82. Total cost per yard mile (cents)	12.8	29	10.27.
MISCELLANEOUS.			
83. Fuel consumed during year (long ton or barrel)	1,171 tons	283.25 tons	410 tons.
84. Average cost of fuel per long ton (or barrel)	$5.82	$5.94	$4.14.
85. Fuel consumed per yard of dredged material in pounds—(Item 83+Item 47.	10.8	26.20	11.5.
86. Cost of water per 1,000 gallons	Supplied free	15 cents	25 cents.
87. Water purchased during year	do	78,000 gallons	18,000 gallons.
88. Total mileage of dredge during year	4,660	480	1,122.5.
89. Maximum dredging depth	25 feet	25 feet	25 feet.
90. Number of shifts worked per day	1	1	1.
91. Signed letters			
92. Wireless			
	Remarks.	*Remarks.*	*Remarks.*
	The U. S. Absecon was transferred to Cold Spring Inlet and remained there 1,248 hours; returned to Absecon Inlet Feb. 22, 1917. It was also transferred on Oct. 18, 1917, to the Philadelphia district and remained there for 1,392 hours; returned to Absecon Inlet Dec. 15, 1917. The channel has been maintained at a general depth of somewhat more than 12 feet, with a minimum width of 300 feet. The length of the channel is about 2,600 feet. The dredge was docked in Philadelphia, Pa., for general repairs Aug. 16, 1917, and remained in dock for 192 hours. The extraordinary repairs to hull and machinery were made while in drydock, and include cleaning, painting, riveting, draghead, propellers, boiler parts, valves, crankshaft, etc. The present sand pump will run probably about 12 months more without new liners.	The channel has been increased to depth from a minimum depth of 13 feet to a general depth of between 20 and 25 feet, over a width of 400 feet and a length of about 1,000 feet. Present sand pump will probably run about 12 months more without new liners. The U. S. dredge Absecon returned from Cold Spring Inlet to Absecon Inlet on Feb. 22, 1917.	The dredge worked on Mud Island range, Van Sciver range, and Grubb range in the Delaware River above Philadelphia. The material removed was dumped back of Mud Island in a natural basin. Dredge departed from Wilmington district Oct. 18, 1917, arrived back Dec. 14, 1917.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Atlantic.*
1. District to which dredge belongs	Second New York.
2. Where built	Sparrows Point, Md.
3. When built	1904–5.
4. Builder	Maryland Steel Co.
5. Contract cost	$304,000.
6. Cost of outfit	$37,577.24.
7. Total first cost	$361,500 (includes changes while building).
8. Present value	See report for second New York district.
9. Time to build	20 months.
10. Material of hull	Steel.
11. Length over all	288 feet.
12. Length between perpendiculars	274 feet.
13. Beam	47 feet 6 inches.
14. Depth amidship	25 feet.
15. Drafts, light:	
(*a*) Forward	10 feet 6 inches.
(*b*) Aft	12 feet 6 inches.
16. Drafts, loaded:	
(*a*) Forward	21 feet.
(*b*) Aft	21 feet 6 inches.
17. Displacement:	
(*a*) Light	2,670.
(*b*) Loaded	5,670.
18. Number of hoppers	2.
19. Total capacity of hoppers	2,476 cubic yards.
20. Number of drags	2.
21. Type of drag	Ambrose Channel special design.
22. Number, size, and type of—	
(*a*) Dredging pumps	Two 20-inch centrifugal.
(*b*) Pumping engines	Two 16 and 32 by 18 inch, compound.
23. Revolutions per minute of pumping engines	160–170.
24. Total indicated horsepower of pumping engines	616 on test Oct. 11, 1910, steam 112 pounds.
25. Number, size, and type of propelling engines	Two 22 and 44 by 30 inch, compound.
26. Revolutions per minute of propelling engines:	
(*a*) Light	110–112.
(*b*) Loaded	104–108.
(*c*) While dredging	0–112.
27. Total indicated horsepower of propelling engines	1,412 with steam at 113 pounds.
28. Average speed:	
(*a*) Light	10 knots.
(*b*) Loaded	8 knots.
(*c*) While dredging	0.5–3 knots.
29. Number and type of boilers	4 Scotch marine.

30. Dimensions of boilers:	
(a) Diameter	14 feet.
(b) Length	12 feet.
(c) Heating surface (total)	10,704 square feet.
(d) Grate surface (total)	280 square feet.
31. Boiler pressure (gauge)	110 pounds.
32. Number of men in crew	53.
33. Number of men required to operate dredge with single crew.	25.

OPERATIONS.	OPERATIONS.	OPERATIONS.	OPERATIONS.
34. Location of dredging	New London Harbor, Conn.	Red Hook Channel, New York Harbor (second district).	Hudson River Channel, N. Y.
35. Depth at mean low water before dredging	25 to 33 feet	9 to 18 feet	20 to 25 feet.
36. Depth at mean low water after dredging	30 feet	9 to 22 feet	40 feet.
37. Character of dredged material	Mud, small quantity of sand and gravel.	Fine sand	Mud, ashes, stones, shells, bricks, etc.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.	1,620	320.5 miles	1,200.
39. Total number of loads dredged during year	574	309	50.
40. Average distance from work to dump per load	2¼ miles	1 mile	24 miles.
41. Average number of loads dredged daily (counting days worked).	3.63	4⅓	1.44.
42. Maximum amount in cubic yards dredged in one day.	9,646	8,103	3,158.53.
43. Maximum amount in cubic yards per load	2,218	1,648	2,183.62.
44. Average amount in cubic yards per load	1,682	1,251	2,158.
45. Average amount in cubic yards dredged per hour pumping = Item 47 ÷ Item 50 a.	422.4		378.88.
46. Maximum amount in cubic yards dredged per hour pumping	672	618	424.45.
47. Total amount in cubic yards dredged during year	991,391	386,747	109,181.
48. Maximum amount in cubic yards dredged in one month.	164,343	152,121	75,772.
49. Total amount in cubic yards dredged by this dredge in this locality.	1,445,853	732,588	109,181.

DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:									
(a) Pumping	2,370	25	0.5013	839	10		288	10	28.19
(b) Turning in cut	177	30	.0375	24	40		24	50	2.44
(c) To and from dump	420	55	.0890	122	15		288	55	28.27
(d) Dumping	210	10	.0444	36	25		31		3.03
(e) Taking fuel and supplies	108		.0228	132	5		107	45	10.54
(f) To and from wharf and anchorage	27	5	.0060	54			3	15	.32
51. Time lost from work:									
(a) Bad weather	171	10	.0362				27	30	2.69
(b) Ordinary repairs	127	20	.0270	902			8		.78
(c) Extraordinary repairs									

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Atlantic.*								
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
51. Time lost from work—Continued.									
(d) Alterations and additions									
(e) Out of commission									
(f) Lying at berths nights and after working hours	168		.0355	481	25		49		4.80
(g) Transferring from one district to another	24		.0050	24					
(h) Miscellaneous	155	25	.0329				1	35	.15
(i) Sundays and holidays	768		.1624	384			192		18.79
52. Total number of hours in year	8,760		100.00	8,760		100.00	8,760		100.00
53. Total time at work	3,314	5	70.09	1,208	35		743	55	
54. Total time lost from work (exclusive of Sundays, holidays, and transfers, Item [51−(g+i)]	621	55	13.16	1,383	25		86	5	
55. Number of days upon which any dredging was done	164			71			34 days 13 hours 37 minutes.		
56. Average number of working hours per day	19 hours 23 minutes			17 hours 1 minute			21 hours 14 minutes.		
57. Maximum number of working hours per day	24			24			24 hours.		
58. Average time to dredge one load	4 hours 18¼ minutes			3 hours 55 minutes			14 hours 53 minutes.		
59. Average time to dump one load	21.4 minutes			7 minutes			37 minutes 12 seconds.		
60. Average time spent going to and from dump	43 minutes			24 minutes			5 hours 47 minutes.		

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$23,911.95	0.1990	$16,433.70	47.66	$5,029.67	37.85
62. Coal	54,002.25	.4482	4,040.88	11.72	5,451.45	41.02
63. Fuel oil						
64. Water	728.81	.0059	25.97	.08	45.00	.34
65. Supplies:						
(a) Subsistence	7,443.92	.0618	4,240.18	12.30	1,512.00	11.38
(b) Engine room	1,356.68	.0110	557.69	1.62	295.00	2.22
(c) Miscellaneous	988.47	.0082	827.88	2.40	380.00	2.86
66. Renewals of or additions to outfit	1,372.81	.0113	4,519.84	13.11	530.00	3.98
67. Ordinary repairs:						
(a) Hull	1,363.42	.0113	1,500.00	4.35		
(b) Machinery	884.86	.0073	1,032.47	2.99		
68. Extraordinary repairs:						
(a) Hull						
(b) Machinery						

69. Alterations and additions:						
(a) Hull						
(b) Machinery						
70. Laundry and miscellaneous expenses, wharfage, etc	126.18	.0010	289.83	.84	47.00	.35
71. Office expense	1,770.59	.0150	510.00	1.48		
72. Surveys and superintendence	4,219.90	.0350	500.00	1.45		
73. Rental	22,316.37	.1850				
Total cost	120,485.21		34,478.44	100.00	13,290.12	100.00
74. Operating cost for year	$112,166.94		$30,935.97		$13,290.12.	
75. Cost per hour of time at work. Item 74 ÷ Item 53	$33.85		$25.60		$17.87.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75 × Item 54.	$21,054.70		$3,561.54		$1,538.30.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75 ÷ Item 78.	11.32		8		0.121.	
78. Average number of cubic yards dredged per hour of time at work = Item 47 ÷ Item 53.	299		320		146.77.	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost − (Items 67 + 68 + 69)] ÷ Item 47.	11.92		8.26		0.1217.	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost − (Items 68 + 69)] ÷ Item 47.	12.15		8.92		0.1217.	
81. Gross cost per cubic yard (cents). Total cost ÷ Item 47.	12.15		8.92		0.1217.	
82. Total cost per yard mile (cents)	4.47				0.00507.	
MISCELLANEOUS.						
83. Fuel consumed during year (long ton or barrel)	5,981 gross tons		929 long tons		1,285 long tons.	
84. Average cost of fuel per long ton (or barrel)	$9.03		$4.35		$1.24 per ton.	
85. Fuel consumed per yard of dredged material in pounds—Item 83 ÷ Item 47.	13.51		5.38 pounds		263.42 pounds.	
86. Cost of water per 1,000 gallons	40 cents		20 cents		$15 per 1,000.	
87. Water purchased during year	1,822,035.5 gallons		129,850 gallons		300,000 gallons.	
88. Total mileage of dredge during year	8,650		2,800		2,400 miles.	
89. Maximum dredging depth	55 feet		55 feet		55 feet.	
90. Number of shifts worked per day	3		3		3.	
91. Signal letters						
92. Wireless						
	Remarks. Dredge returned to second New York district July 16, 1917.		*Remarks.* The dredge Atlantic was operated by the second district, New York, from July 16 to Nov. 18, 1917 (inclusive dates).		*Remarks.* Dredge operating in Hudson River Channel, N. Y., Nov. 19 to Dec. 31, 1917.	

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Benyaurd.*	*Burton.*	*Cape Fear.*
1. District to which dredge belongs	New Orleans, La.	Cleveland, Ohio.	Wilmington, N. C.
2. Where built	Richmond and Norfolk, Va.	Sparrows Point, Md.	Philadelphia, Pa.
3. When built	1900-1904	1904	1895.
4. Builder	Wm. R. Trigg Co., Richmond, Va., and Norfolk Navy Yard.	Maryland Steel Co	Chas. Hillman Ship & Engine Building Co.
5. Contract cost	$286,605	$165,000	$55,780.
6. Cost of outfit	$127,633.37, including finishing at Norfolk, due to failure of Trigg Co.	$19,300	$5,029.30.
7. Total first cost	$414,238.37	$184,300	$60,809.30.
8. Present value	$204,000	$150,000	$35,000.
9. Time to build	4 years	1 year 4 months	9 months.
10. Material of hull	Steel	Steel	Wood.
11. Length over all	271 feet 6 inches	177 feet	131 feet 3 inches.
12. Length between perpendiculars	260 feet	166 feet	113 feet 9 inches.
13. Beam	47 feet 6 inches	38 feet	29 feet.
14. Depth amidship	23 feet	19 feet	12 feet.
15. Drafts, light:			
(*a*) Forward	11 feet 2 inches	8 feet 10 inches	7 feet 4 inches.
(*b*) Aft	12 feet 6 inches	11 feet	13 feet 4 inches.
16. Drafts, loaded:			
(*a*) Forward	19 feet	17 feet 6 inches	15 feet 3 inches.
(*b*) Aft	20 feet 6 inches	17 feet 3 inches	12 feet 11 inches.
17. Displacement:			
(*a*) Light	2,978 tons	1,510 tons	480 tons.
(*b*) Loaded	5,436 tons	2,795 tons	870 tons.
18. Number of hoppers	2	2	2.
19. Total capacity of hoppers	2,214 cubic yards	935 cubic yards	300 cubic yards.
20. Number of drags	2	2	2.
21. Type of drag	Grating type	Flat grillage	Scraper type.
22. Number, size, and type of—			
(*a*) Dredging pumps	Two 20-inch centrifugal	Two 15-inch centrifugal (compound)	Two 10-inch centrifugal.
(*b*) Pumping engines	Two 16 and 32 by 20 inch compound	Two 12-inch and 22-inch by 14-inch	Two 10½-inch diameter by 10½-inch stroke.
23. Revolutions per minute of pumping engines	150	200	245.
24. Total indicated horsepower of pumping engines	738	334.5	175.
25. Number, size, and type of propelling engines	2 compound, 20 and 40 by 30 inch	2 vertical compound, 15 and 30 by 24 inch.	One 15 and 30 by 24 inch compound.
26. Revolutions per minute of propelling engines:			
(*a*) Light	140	106	135.
(*b*) Loaded	130	96	126.
(*c*) While dredging	Variable	10 to 115	72.
27. Total indicated horsepower of propelling engines	1,500	745.9	390.

28. Average speed:							
(a) Light	9.5 knots	7 knots					8 knots.
(b) Loaded	7.5 knots	5 knots					5 knots.
(c) While dredging	1 to 5 knots	1.5 knots					2 knots.
29. Number and type of boilers	4 Scotch marine	2 single-ended Scotch					1 Scotch marine.
30. Dimensions of boilers:							
(a) Diameter	13 feet 6 inches	13 feet					12 feet 6 inches.
(b) Length	12 feet	12 feet					11 feet ¾ inch.
(c) Heating surface (total)	10,528 square feet	4,124 square feet					1,800 square feet.
(d) Grate surface (total)	290 square feet	125 square feet					61 square feet.
31. Boiler pressure (gauge)	120 pounds	120 pounds per square inch					115 pounds.
32. Number of men in crew	51	30					17 single; 32 double crew.
33. Number of men required to operate dredge with single crew.	51	30					17.
OPERATIONS.							
34. Location of dredging	Southwest Pass, South Pass, and Head of Passes, Mississippi River.	Toledo.	Huron.	Cleveland.	Fairport.	District.	(a) Cape Fear River, N. C.; (b) Beaufort Inlet, N. C.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	
35. Depth at mean low water before dredging		17.7	19.6	19	15.7		(a) 16; (b) 20-26.
36. Depth at mean low water after dredging		19	20.8	21	20.8		(a) 20; (b) 30.
37. Character of dredged material	Sand, silt, and mud	Mud and sand.	Sand.	Mud and sand.	Sand.		Sand, mud, clay, shells, and débris.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.	4,639	1,500	27	60	18	1,605	1,731.
39. Total number of loads dredged during year	1,354	367	27	106	18	518	974.
40. Average distance from work to dump per load	3.4 miles	4.1	1	0.6	1	3.1	1¾ miles.
41. Average number of loads dredged daily (counting days worked).	5.6	2.4	3	3.3	2.2	2.6	5.9.
42. Maximum amount in cubic yards dredged in 1 day	9,773	2,840	1,961	2,130	2,132	2,840	4,494.
43. Maximum amount in cubic yards per load	1,656	965	561	705	797	965	315.
44. Average amount in cubic yards per load	1,198.7	790	450	492	590	708	303.9.
45. Average amount in cubic yards dredged per hour pumping=item 47÷item 50 a.	977	293	222	243	225	279	281.
46. Maximum amount in cubic yards dredged per hour pumping.	1,280	435	261	297	293	435	536.
47. Total amount in cubic yards dredged during year	1,623,009	289,528	12,139	52,189	10,618	364,474	(a) 231,336; (b) 64,711.
48. Maximum amount in cubic yards dredged in 1 month.	116,486	59,504					42,816.
49. Total amount in cubic yards dredged by this dredge in this locality.	16,380,140 Southwest Pass, 3,406,966 South Pass, 91,127 Head of Passes.	3,602,502, Cleveland district					(a) 7,991,336; (b) 1,294,569.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Benyaurd.*			*Burton.*			*Cape Fear.*		
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:									
(*a*) Pumping	1,661	35	19.00	1,303	10	14.88	1,053	45	12.03
(*b*) Turning in cut	4	55	.05				180	5	2.07
(*c*) To and from dump	667	45	7.62	518	50	5.92	405	5	4.63
(*d*) Dumping	262	35	3.00				80	55	.93
(*e*) Taking fuel and supplies	596	30	6.80	111	35	1.27	1,073	15	12.26
(*f*) To and from wharf and anchorage	349	25	4.00	92	45	1.06	291	30	3.34
51. Time lost from work:									
(*a*) Bad weather	244	20	2.80	79	55	.91	595	45	6.82
(*b*) Ordinary repairs	10		.11	776	45	8.87	486	25	5.56
(*c*) Extraordinary repairs	78	10	.89	64		.73	216		2.47
(*d*) Alterations and additions									
(*e*) Out of commission							2,782		31.66
(*f*) Lying at berths nights and after working hours	3,585	45	40.93	4,309	40	49.20	606	25	6.93
(*g*) Transferring from one district to another									
(*h*) Miscellaneous	100	25	1.14	87	20	1.00	201	20	2.30
(*i*) Sundays and holidays	1,196	35	13.66	1,416		16.16	787	30	9.00
52. Total number of hours in year	8,760		100.00	8,760		100.00	8,760		100.00
53. Total time at work	3,544	45	40.50	2,026	20		3,084	35	
54. Total time lost from work (exclusive of Sundays, holidays, and transfers, Items [51−(g+i)]	4,018	40	45.84	5,317	40		4,887	55	
55. Number of days upon which any dredging was done	240			201			165.		
56. Average number of working hours per day	14 hours 46 minutes			10 hours 5 minutes			18 hours 45 minutes.		
57. Maximum number of working hours per day	15 hours 40 minutes			14 hours 5 minutes			24.		
58. Average time to dredge one load	1 hour 13 minutes			2 hours 31 minutes			1 hour 5 minutes.		
59. Average time to dump one load	12 minutes			No delay			5 minutes.		
60. Average time spent going to and from dump	29 minutes			1 hour			25 minutes.		

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$31,991.91	30.92	$24,883.25	43.5	$12,046.77	37.0
62. Coal	30,621.08	29.59	15,569.87	27.8	8,516.75	26.5
63. Fuel oil						

64. Water					62.36	.2
65. Supplies:						
(a) Subsistence	10,216.66	9.87	5,935.44	10.4	3,169.06	9.9
(b) Engine room	2,164.57	2.09	761.26	1.3	571.98	1.8
(c) Miscellaneous	4,764.77	4.60	615.69	1.1	211.72	.7
66. Renewals of or additions to outfit	38.62	.037	783.38	1.4	845.57	2.6
67. Ordinary repairs:						
(a) Hull			198.31	.3	901.24	2.8
(b) Machinery	3.53	.003	1,333.38	2.3	1,064.90	3.3
68. Extraordinary repairs:						
(a) Hull	5,957.67	5.76	2,133.65	3.7	1,055.85	3.3
(b) Machinery	14,402.36	13.92	616.01	1.1	407.50	1.3
69. Alterations and additions:						
(a) Hull						
(b) Machinery						
70. Laundry and miscellaneous expenses, wharfage, etc.	236.45	.23	336.85	.6	1,689.44	5.2
71. Office expense	3,073.55	2.98	1,500.00	2.6	257.29	.9
72. Surveys and superintendence			2,500.00	4.4	1,279.44	3.9
73. Rental						
Total cost	103,471.17	100.00	57,165.09	100.0	32,078.87	100.0
74. Operating cost for year	$80,034.06		$48,883.74		$27,112.65.	
75. Cost per hour of time at work. Item 74÷Item 53	$22.57		$24.12		$8.79.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.	$90,708.83		$128,262.12		$42,964.73.	

		Toledo.	Huron.	Cleveland.	Fairport.	District.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.	$0.049	13.8	14.8	10.7	13.8	13.4	$0.09+.
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.	458	174.0	163.0	224.0	174.0	180	95.96.
79. Cost per cubic yard with no repairs or additions (cents). [Total cost−(Items 67+68+69)]÷Item 47.	$0.051	14.0	17.5	15.7	19.0	14.5	9.67.
80. Cost per cubic yard with ordinary repairs (cents). [Total cost−(Items 68+69)]÷Item 47.	$0.051	14.4	19.0	15.9	19.4	14.9	10.34.
81. Gross cost per cubic yard (cents). Total cost÷Item 47.	$0.063	15.1	20.0	16.8	20.4	15.7	10.83.
82. Total cost per yard mile (cents)	$0.019	3.7	20.0	28.0	20.4	5.1	6.2.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Benyaurd.*	*Burton.*	*Cape Fear.*
MISCELLANEOUS.			
83. Fuel consumed during year (long ton or barrel)	6,636 long tons, 7,432.3 short tons	2,526 tons	1,250 tons.
84. Average cost of fuel per long ton	$4.61	$6.11	$6.81.
85. Fuel consumed per yard of dredged material in pounds—Item 83÷Item 47.	9.16	15.5	9.45.
86. Cost of water per 1,000 gallons			59 cents.
87. Water purchased during year			105,600.
88. Total mileage of dredge during year	10,120	6,570	4,000.
89. Maximum dredging depth	40 feet	30 feet	35 feet.
90. Number of shifts worked per day	1	1	3 shifts, double crew.
91. Signal letters			
92. Wireless			
	Remarks.	*Remarks.*	*Remarks.*
	This dredge was not docked during the calendar year 1917, having undergone general overhauling, which was completed on Dec. 16, 1916. The age of the present sand pump is 3¼ years and will run without new liners for a period of 1 year.	All work was maintenance dredging. Shoals were removed at Huron, Cleveland, and Fairport Harbors. At Toledo Harbor the usual maintenance dredging was done. The average annual fill at the latter harbor is estimated at 300,000 cubic yards, and a total of 289,528 cubic yards was removed during the year. Extraordinary repairs to hull made in dry dock consisted of repairs to rudder and to bottom discharge gates in the hoppers. Outboard bearings were also rebabbitted. Other extraordinary repairs were to boilers. Dredge was dry docked once, Dec. 12 to 19. Present sand pumps have been used 3 years and will run another year without new liners.	Hull was scraped and cleaned; caulked. Shaft was remetaled and stern bearing bushed. Dredge was docked twice during year, and remained on ways about 10 days. Parts of pump are of different ages, varying from 6 months to 14 months. Will run about 6 months.

Name	*Caucus.*	*Charleston.*	*Chinook.*[1]
1. District to which dredge belongs	Montgomery, Ala	Mobile, Ala	Second Portland, Oreg.
2. Where built	Greensport, L. I	Brooklyn, N. Y	Belfast, Ireland.
3. When built	1905	1891	1892.[2]
4. Builder	James Reilly Repair & Supply Co	Henry Lawrence	Harland & Wolfe.
5. Contract cost	$150,000	$65,000	Unknown.[3]
6. Cost of outfit	$26,000	$4,000 (approximate)	Do.[3]
7. Total first cost	$176,000	$69,000	Do.[3]
8. Present value	$100,000	$60,000	$374,400.
9. Time to build	2 years 7 months	9 months	([3]).
10. Material of hull	Wood	Oak frames, oak and pine planking	Steel.
11. Length over all	200 feet	122 feet 6 inches	460 feet.
12. Length between perpendiculars	185 feet	117 feet	445 feet.
13. Beam	41 feet	30 feet	49 feet.
14. Depth amidship	23 feet 2 inches	19 feet 8 inches	34 feet.
15. Drafts, light:			
(a) Forward	13 feet 6 inches	10 feet 8 inches	17 feet 6 inches.
(b) Aft	14 feet 6 inches	12 feet 1 inch	Do.
16. Drafts, loaded:			
(a) Forward	19 feet 6 inches	15 feet 5 inches	24 feet.
(b) Aft	14 feet 6 inches	17 feet 1 inch	Do.
17. Displacement:			
(a) Light	1,980 tons	800 tons	7,400 tons.
(b) Loaded	3,180 tons	1,100 tons	12,500 tons.
18. Number of hoppers	2	2	2.
19. Total capacity of hoppers	977 cubic yards	312 cubic yards	3,500 cubic yards.
20. Number of drags	2	1	4.
21. Type of drag	Allen	Ordinary	New York flat.
22. Number, size, and type of—			
(a) Dredging pumps	Two 18-inch centrifugal	One 15-inch centrifugal, Edward make	Two 20-inch centrifugal and two 30-inch centrifugal.
(b) Pumping engines	Two 14 and 26 by 18 inch compound	1, fore-and-aft compound, 13 by 23 by 14 inch.	Two 13 and 20 and 31½ by 20 inch triple expansion and two 17 and 27½ and 42 by 20 inch triple expansion.
23. Revolutions per minute of pumping engines	185	225	150.
24. Total indicated horsepower of pumping engines	670	250	2,000.
25. Number, size, and type of propelling engines	One 22 and 44 by 30 inch compound	1, size 17 by 32 by 22 inches, steeple compound.	Two 22½ and 36½ and 60 by 48 inch triple expansion.
26. Revolutions per minute of propelling engines:			
(a) Light	88	120	70.
(b) Loaded	82	110	65.
(c) While dredging	82	75	55.
27. Total indicated horsepower of propelling engines	725	360	3,300.
28. Average speed:			
(a) Light	9 knots	7.75 knots	12 knots.
(b) Loaded	6 knots	5.8 knots	11 knots.
(c) While dredging	1 knot	2 knots	2 knots.
29. Number and type of boilers	2 Scotch marine	1 Scotch marine	2 double end and 2 single end Scotch marine.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Caucus.*		*Charleston.*				*Chinook.*
30. Dimensions of boilers:							
(*a*) Diameter	14 feet		13 feet				14 feet 1 inch.
(*b*) Length	12 feet		12 feet				Double end, 17 feet; single end, 9 feet 9 inches.
(*c*) Heating surface (total)	5,473 square feet		1,175 square feet				13,473 square feet.
(*d*) Grate surface (total)	147 square feet		72 square feet				18 oil burners; 18 furnaces of 43 inches each.
31. Boiler pressure (gauge)	120 pounds		100 pounds				145 pounds.
32. Number of men in crew	10		27				71.
33. Number of men required to operate dredge with single crew.	32		18				45.
OPERATIONS.							
34. Location of dredging	No dredging in Montgomery, Ala., district during the year.	Brunswick Harbor, Ga.	Mobile Bar, Ala.	Ship Island Pass, Miss.	Horn Island Pass, Miss.	Pascagoula Channel, Miss.	Columbia River Bar.
			Feet.	*Feet.*	*Feet.*	*Feet.*	
35. Depth at mean low water before dredging		20 to 22 feet	28–30	23.5–24	18–22	15–22	34 feet.
36. Depth at mean low water after dredging		22 to 24 feet	30–32	26	20–22	15–22	Minimum, 36 feet; maximum, 43 feet.
37. Character of dredged material		Sand, shell, and mud	Sand and mud				Sand.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.		101 (Brunswick Harbor).	878.75				731.
39. Total number of loads dredged during year		96 (Brunswick Harbor).	1,809				489.
40. Average distance from work to dump per load		1.05 miles	0.486 mile				1.495 miles.
41. Average number of loads dredged daily (counting days worked).		5.33	11.82				4.366.
42. Maximum amount in cubic yards dredged in 1 day		5,920	4,810				20,910.
43. Maximum amount in cubic yards per load		977	312				3,520.
44. Average amount in cubic yards per load		919	220.77				2,831.1.
45. Average amount in cubic yards dredged per hour pumping=Item 47÷Item 50 a.		824.5	474.24				1,491.31.
46. Maximum amount in cubic yards dredged per hour pumping.		1,067	925				2,898.
47. Total amount in cubic yards dredged during year		88,222 (Brunswick Harbor).	399,377[1]				1,384,405.
48. Maximum amount in cubic yards dredged in 1 month.		60,988	81,030				357,505.
49. Total amount in cubic yards dredged by this dredge in this locality.		88,222 (Brunswick Harbor).	399,377[1]				8,950,483.

DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:												
(a) Pumping				107	1	1.222	842	8	9.61	928	19	10.5972
(b) Turning in cut				1	6	.013				128	39	1.4680
(c) To and from dump				44	37	.509	335	.22	3.83	140	22	1.6023
(d) Dumping				11	30	.131	127		1.45	50	10	.5726
(e) Taking fuel and supplies				27	55	.319	184		2.10	8	45	.0999
(f) To and from wharf and anchorage				51	18	.586	442	43	5.05	289		3.3000
51. Time lost from work:												
(a) Bad weather							268	34	3.07	678	25	7.7444
(b) Ordinary repairs				70	7	.800	191	45	2.19	29	45	.3396
(c) Extraordinary repairs				24		.274	647	10	7.39	164	35	1.8788
(d) Alterations and additions												
(e) Out of commission	5,088		72.85				936		[1] 10.68	2,640		30.1370
(f) Lying at berths nights and after working hours				370	50	4.233	3,237	18	36.96	892	20	10.1865
(g) Transferring from one district to another				360		4.110						
(h) Miscellaneous	600		8.59	11	36	.132				1,873	40	21.3888
(i) Sundays and holidays	1,296		18.56	120		1.370	1,548		17.67	936		10.6849
52. Total number of hours in year	8,760		100.00	8,760		100.00	8,760		100.00	8,760		100.00
53. Total time at work	None.			243	27	2.780	1,931	13	22.04	1,545	15	
54. Total time lost from work (exclusive of Sundays, holidays, and transfers, Item [51−(g+i)]	5,688		81.44	476	33	5.439	5,280	47	60.29	6,278	45	
55. Number of days upon which any dredging was done	None			18			153			112.		
56. Average number of working hours per day				13 hours 31 minutes			12 hours 37 minutes			13.797.		
57. Maximum number of working hours per day				14 hours			16 hours 25 minutes			18.833.		
58. Average time to dredge one load				1 hour 6.9 minutes			0.465 hour			1.90 hours.		
59. Average time to dump one load				7.2 minutes			0.0702 hour			6.18 minutes.		
60. Average time spent going to and from dump				26.8 minutes			0.185 hour			17.22 minutes.		

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$6,730.94	47.29	$3,390.31	23.432	$16,475.83	48.44	$40,794.61	29.1552
62. Coal	2,262.57	15.90	4,475.03	30.929	2,493.59	7.33	361.70	.2585
63. Fuel oil			11.55	.080			50,754.34	36.2733
64. Water	242.98	1.71	228.63	1.580	50.20	.15	135.00	.0964
65. Supplies:								
(a) Subsistence	1,775.17	12.47	1,256.99	8.688	5,065.07	14.89	9,843.08	7.0347
(b) Engine room	613.60	4.31	783.66	5.416	950.73	2.79	2,874.05	2.0540
(c) Miscellaneous			166.69	1.152	676.39	1.99	2,516.69	1.7987
66. Renewals of or additions to outfit			319.75	2.210	831.68	2.44	2,657.29	1.8991

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name.	*Caucus.*				*Charleston.*		*Chinook.*	
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
67. Ordinary repairs:								
(a) Hull	138.57	0.97			378.41	1.11	770.03	0.5503
(b) Machinery	1,792.09	12.59			203.57	.60	1,188.93	.8497
68. Extraordinary repairs:								
(a) Hull					1,859.86	5.47	11,458.68	8.1894
(b) Machinery					1,188.95	3.50	5,268.60	3.7654
69. Alterations and additions:								
(a) Hull	33.00	.23			9.77	.03		
(b) Machinery					15.41	.05		
70. Laundry and miscellaneous expenses, wharfage, etc.	472.99	3.32	120.91	.836	353.46	1.04	562.61	.4021
71. Office expense	171.67	1.21	1,075.35	7.433	2,549.05	7.50	3,989.13	2.8510
72. Surveys and superintendence					907.53	2.67	6,747.27	4.8222
73. Rental			2,639.76	18.244				
Total cost	14,233.58	100.00	14,468.63	100.00	34,009.50	100.00	139,922.01	100.00
74. Operating cost for year	$12,098.25		$13,393.28		$26,896.95		$110,499.37.	
75. Cost per hour of time at work. Item 74÷Item 53			$55.014		$13.927		$71.50.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.			$26,216.92		$73,545.42		$448,930.625.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.			15.180		6.735		7.9807.	
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.			362.4		206.80		895.91.	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost−(Items 67+68+69)]÷Item 47.			16.400		7.60		8.757.	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost−(Items 68+69)]÷Item 47.			16.400		7.746		8.899.	
81. Gross cost per cubic yard (cents). Total cost÷Item 47.			16.400		8.516		10.107.	
82. Total cost per yard mile (cents)			15.619		17.52		6.7605.	
MISCELLANEOUS.								
83. Fuel consumed during year (long ton or barrel)	550.5 tons		712.75 tons		998 short tons		36,718.45 barrels fuel oil.	
84. Average cost of fuel per long ton (or barrel)	$4.11 per ton		$6.278 per ton		$2.13 to $3.75 per short ton		$1.382 per barrel	
85. Fuel consumed per yard of dredged material in pounds—Item 83÷Item 47.			18.09		4.908		8.514.	

86. Cost of water per 1,000 gallons	$1	$2.097	Flat rate	$5 delivered by barge.
87. Water purchased during year	242,980 gallons	109,000 gallons	186,628 gallons	27,000 gallons.
88. Total mileage of dredge during year	600	2,539	5,000	4,774 miles.
89. Maximum dredging depth	40 feet	40 feet	35 feet	59 feet, 20-inch pumps; 50 feet, 30-inch pumps.
90. Number of shifts worked per day	1 and 3, depending on conditions.	1 and 3, depending on conditions.	1	
91. Signal letters			G. W. M. B	
92. Wireless				
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	Age of present pump, 12 years. Transferred to the Savannah district for work at Brunswick, Ga.; left Pensacola Apr. 11 and returned June 1, 1917. Transferred to the Norfolk, Va., district; left Pensacola Dec. 9, 1917. No accidents. From Mar. 21 to 29, 1917, this dredge was engaged in towing the U. S. dredge Blackwater and attendant plant from St. Andrews Bay, Fla., to Pensacola, Fla., and from Oct. 3 to 22, 1917, was employed by the Navy Department in floating the U. S. S. Quincy. Owing to lack of funds, the dredge was tied up during the remainder of the year.	This dredge belongs to Montgomery, Ala., district; was rented by this district for work in Brunswick Harbor. Leaving Pensacola, Fla., Apr. 11, arriving at Brunswick, Ga., Apr. 17; working in Brunswick Harbor from Apr. 23 to May 23, 1917. Leaving Brunswick May 23, arriving at Pensacola May 30.	Extraordinary repairs to hull consists of removing sheathing and calking wells, renewing sheathing where necessary, new copper sheathing on rudder post, installing hinges on gates, repairs to guards, new wearing strips installed on timbers in wells, repairs to forward water tank, and replacing shoe. The dredge was docked twice during the year, from May 21 to June 11 for a period of 22 days, and from Oct. 3 to Nov. 5 for a period of 34 days. Present sand pump has been in use nearly 4 years and has no liners. [1] Mobile Bar, 104,916; Ship Island Pass, 225,320; Horn Island Pass, 53,946; Pascagoula Channel, 15,195. [2] Laid up on account of lack of funds.	*Extraordinary repairs.*—Hull: Repairs to bin gates and gate rods, gate and deck winches, trunnion pipe and bearing; renewals of 20-inch distributing valves, pipe-line and gangway davits; repairs and renewals to work benches, galley stove, and tiling in floor of pantry and galley. Machinery: Rebabbitted crank shaft bearings and renewed metallic packing; repairs and renewals to 20-inch and 30-inch pumps and engines, auxiliary pumps, and hot well; renewed stay tubes and stay bolts in boilers. The dredge was docked once during the year for a period of 3 days. Present age of 20-inch pumps, 14 years; 30-inch pumps, 4 years. Pumps will run without new liners for about 6 months when dredging 16 hours per day. The channel depth was increased from 37 feet to 40 feet over an area 1,000 feet in width. [1] Formerly United States transport Grant. [2] Transformed from transport to 20-inch dredge in 1903 by the Navy Department at a cost of $217,724.47. Remodeled at Portland, Oreg., in 1910 at an additional cost of $137,075. Two additional pumps, 30-inch, with machinery and auxiliaries were installed at Portland, Oreg., in 1914 at a cost of $107,588. [3] Transferred from Quartermaster Department to Engineer Department.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Clatsop.*	*Comstock.*	*Cumberland.*
1. District to which dredge belongs	Second Portland, Oreg	Galveston	Savannah, Ga.
2. Where built	Newport News, Va	Baltimore, Md	Belfast, Me.
3. When built	1908	1915	1902.
4. Builder	Newport News Shipbuilding Co	Ellicott Machine Corporation	Geo. A. Gilchrist.
5. Contract cost	$234,500	$210,433.68	$144,750.
6. Cost of outfit	Unknown	$3,512.07	$13,700.12.
7. Total first cost	$304,385	$213,945.75	$158,450.12.
8. Present value	$175,000	$208,000	$85,000.
9. Time to build	1 year and 4 months		1 year and 1 month.
10. Material of hull	Steel	Steel	Wood.
11. Length over all	180 feet	163 feet 9¾ inches	200 feet.
12. Length between perpendiculars	168 feet	155 feet	183 feet.
13. Beam	38 feet	35 feet	40 feet 8 inches.
14. Depth amidship	23 feet	17 feet	23 feet 6 inches.
15. Drafts, light:			
(*a*) Forward	12 feet	7 feet 3 inches	13 feet 5 inches.
(*b*) Aft	16 feet	11 feet 6 inches	14 feet 3 inches.
16. Drafts, loaded:			
(*a*) Forward	22 feet 4 inches	15 feet	20 feet 5 inches.
(*b*) Aft	20 feet 4 inches	14 feet 6 inches	19 feet 5 inches.
17. Displacement:			
(*a*) Light	1,360 tons	660 tons	1,905 tons.
(*b*) Loaded	3,158 tons	1,200 tons	3,597 tons.
18. Number of hoppers	2	2	2.
19. Total capacity of hoppers	1,130 cubic yards	490 cubic yards	970.29 cubic yards.
20. Number of drags	2	2	2.
21. Type of drag	New York flat	Ambrose Channel	One special design of Savannah Engineer office. One design, and patented by N. Long.
22. Number, size, and type of:			190.
(*a*) Dredging pumps	Two 18-inch centrifugal	Two 15-inch centrifugal	Two 18-inch centrifugal.
(*b*) Pumping engines	Two 12 and 26 by 18-inch compound	Two 11 and 22 by 14 inch vertical compound.	Two 14 and 26 by 16-inch compound.
23. Revolutions per minute of pumping engines	152	165	540 on trial with 120 pounds steam.
24. Total indicated horsepower of pumping engines	500	450	One 22 and 44 by 30 inch compound.
25. Number, size, and type of propelling engines	One 20 and 44 by 30-inch compound	One 18 and 36 by 24 inch vertical compound.	
26. Revolutions per minute of propelling engines:			
(*a*) Light	110	12–124	105.
(*b*) Loaded	100	115–118	79.
(*c*) While dredging	86	90–95	From 30 to 90.
27. Total indicated horsepower of propelling engines	900	650	835.16 on trial Mar. 17, 1907, with 122 pounds of steam and old propeller.

28. Average speed:				
(a) Light	7 knots	8 knots		10 knots.
(b) Loaded	5 knots	7 knots		8 knots.
(c) While dredging	2 knots	2 knots		1 to 2 knots.
29. Number and type of boilers	2 single-end; Scotch marine	2 Scotch marine		2 Scotch.
30. Dimensions of boilers:				
(a) Diameter	13 feet	11 feet		14 feet.
(b) Length	12 feet	12 feet		12 feet.
(c) Heating surface (total)	3,942 square feet	3,054 square feet		6,600 square feet.
(d) Grate surface (total)	6 oil burners; 6 furnaces of 44 inches each	128 square feet		136 square feet.
31. Boiler pressure (gauge)	135 pounds	150 pounds		120 to 125 pounds.
32. Number of men in crew	40	32		36.
33. Number of men required to operate dredge with single crew.	30	32		36.
OPERATIONS.				
34. Location of dredging	Lower Columbia River, Oreg. and Wash	Mouth of Brazos River, Tex.	Outer Bay, Galveston, Tex.	Savannah Harbor.
35. Depth at mean low water before dredging	21 feet	18.5	28½ feet	23 to 25 feet.
36. Depth at mean low water after dredging	Minimum, 26 feet; maximum, 30 feet	18.5	29 feet	24 to 27 feet.
37. Character of dredged material	Sand	Sand, silt, and mud	Sand, mud, and clay.	Sand, mud, and shell.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.	2,725.68	563½	129	2,587.
39. Total number of loads dredged during year	2,337	985	129	824.
40. Average distance from work to dump per load	1.161 miles	½ to 1 mile (¾ average).	1 mile	3.14 miles.
41. Average number of loads dredged daily (counting days worked).	8.058	5.44	5.16	3.45.
42. Maximum amount in cubic yards dredged in one day.	19,306	3,430	2,940	6,290.
43. Maximum amount in cubic yards per load	1,184	490	490	970.
44. Average amount in cubic yards per load	1,060.61	490	490	1,060 (by time pumping).
45. Average amount in cubic yards dredged per hour pumping—Item 47÷Item 50 a.	889.65	373.32	373.32	611.1.
46. Maximum amount in cubic yards dredged per hour pumping.	2,192	471.93	345	1,260.
47. Total amount in cubic yards dredged during year	2,478,648	545,860	545,860	873,931.
48. Maximum amount in cubic yards dredged in one month.	288,890	79,870	48,610	97,156.
49. Total amount in cubic yards dredged by this dredge in this locality.	17,642,991	482,650	63,210	9,963,727.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Benyaurd.*			*Burton.*			*Cape Fear.*		
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:									
(*a*) Pumping	1,661	35	19.00	1,303	10	14.88	1,053	45	12.03
(*b*) Turning in cut	4	55	.05				180	5	2.07
(*c*) To and from dump	667	45	7.62	518	50	5.92	405	5	4.63
(*d*) Dumping	262	35	3.00				80	55	.93
(*e*) Taking fuel and supplies	598	30	6.80	111	35	1.27	1,073	15	12.26
(*f*) To and from wharf and anchorage	349	25	4.00	92	45	1.06	291	30	3.34
51. Time lost from work:									
(*a*) Bad weather	244	20	2.80	79	55	.91	595	45	6.82
(*b*) Ordinary repairs	10		.11	776	45	8.87	486	25	5.56
(*c*) Extraordinary repairs	78	10	.89	64		.73	216		2.47
(*d*) Alterations and additions									
(*e*) Out of commission							2,782		31.66
(*f*) Lying at berths nights and after working hours	3,585	45	40.93	4,309	40	49.20	606	25	6.93
(*g*) Transferring from one district to another									
(*h*) Miscellaneous	100	25	1.14	87	20	1.00	201	20	2.30
(*i*) Sundays and holidays	1,196	35	13.66	1,416		16.16	787	30	9.00
52. Total number of hours in year	8,760		100.00	8,760		100.00	8,760		100.00
53. Total time at work	3,544	45	40.50	2,026	20		3,084	35	
54. Total time lost from work (exclusive of Sundays, holidays, and transfers, Items [51−(g+i)]	4,018	40	45.84	5,317	40		4,887	55	

	Benyaurd.	Burton.	Cape Fear.
55. Number of days upon which any dredging was done	240	201	165.
56. Average number of working hours per day	14 hours 46 minutes	10 hours 5 minutes	18 hours 45 minutes.
57. Maximum number of working hours per day	15 hours 40 minutes	14 hours 5 minutes	24.
58. Average time to dredge one load	1 hour 13 minutes	2 hours 31 minutes	1 hour 5 minutes.
59. Average time to dump one load	12 minutes	No delay	5 minutes.
60. Average time spent going to and from dump	29 minutes	1 hour	25 minutes.

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$31,991.91	30.92	$24,883.25	43.5	$12,046.77	37.6
62. Coal	30,621.08	29.59	15,569.87	27.3	8,515.75	26.5
63. Fuel oil						

64. Water					62.36	.2
65. Supplies:						
(a) Subsistence	10,216.66	9.87	5,935.44	10.4	3,169.06	9.9
(b) Engine room	2,164.57	2.09	761.26	1.3	571.98	1.8
(c) Miscellaneous	4,764.77	4.60	615.69	1.1	211.72	.7
66. Renewals of or additions to outfit	38.62	.037	783.38	1.4	845.57	2.6
67. Ordinary repairs:						
(a) Hull			198.31	.3	901.24	2.8
(b) Machinery	3.53	.003	1,333.38	2.3	1,064.90	3.3
68. Extraordinary repairs:						
(a) Hull	5,957.67	5.76	2,133.65	3.7	1,055.85	3.3
(b) Machinery	14,402.36	13.92	616.01	1.1	407.50	1.3
69. Alterations and additions:						
(a) Hull						
(b) Machinery						
70. Laundry and miscellaneous expenses, wharfage, etc.	236.45	.23	336.85	.6	1,689.44	5.2
71. Office expense	3,073.55	2.98	1,500.00	2.6	257.29	.9
72. Surveys and superintendence			2,500.00	4.4	1,279.44	3.9
73. Rental						
Total cost	103,471.17	100.00	57,165.09	100.0	32,078.87	100.0

		Toledo.	Huron.	Cleveland.	Fairport.	District.	
74. Operating cost for year	$80,034.06	$48,883.74					$27,112.65.
75. Cost per hour of time at work. Item 74÷Item 53	$22.57	$24.12					$8.79.
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.	$90,708.83	$128,262.12					$42,964.73.
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.	$0.049	13.8	14.8	10.7	13.8	13.4	$0.09+.
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.	458	174.0	163.0	224.0	174.0	180	95.96.
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69)]÷Item 47.	$0.051	14.0	17.5	15.7	19.0	14.5	9.67.
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69)]÷Item 47.	$0.051	14.4	19.0	15.9	19.4	14.9	10.34.
81. Gross cost per cubic yard (cents). Total cost÷Item 47.	$0.063	15.1	20.0	16.8	20.4	15.7	10.83.
82. Total cost per yard mile (cents)	$0.019	3.7	20.0	28.0	20.4	5.1	6.2.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Benyaurd.*	*Burton.*	*Cape Fear.*
MISCELLANEOUS.			
83. Fuel consumed during year (long ton or barrel)	6,636 long tons, 7,432.3 short tons	2,526 tons	1,250 tons.
84. Average cost of fuel per long ton	$4.61	$6.11	$6.81.
85. Fuel consumed per yard of dredged material in pounds—Item 83÷Item 47.	9.16	15.5	9.45.
86. Cost of water per 1,000 gallons			59 cents.
87. Water purchased during year			105,600.
88. Total mileage of dredge during year	10,120	6,570	4,000.
89. Maximum dredging depth	40 feet	30 feet	35 feet.
90. Number of shifts worked per day	1	1	3 shifts, double crew.
91. Signal letters			
92. Wireless			
	Remarks.	*Remarks.*	*Remarks.*
	This dredge was not docked during the calendar year 1917, having undergone general overhauling, which was completed on Dec. 16, 1916. The age of the present sand pump is 3¼ years and will run without new liners for a period of 1 year.	All work was maintenance dredging. Shoals were removed at Huron, Cleveland, and Fairport Harbors. At Toledo Harbor the usual maintenance dredging was done. The average annual fill at the latter harbor is estimated at 300,000 cubic yards, and a total of 289,528 cubic yards was removed during the year. Extraordinary repairs to hull made in dry dock consisted of repairs to rudder and to bottom discharge gates in the hoppers. Outboard bearings were also rebabbitted. Other extraordinary repairs were to boilers. Dredge was dry docked once, Dec. 12 to 19. Present sand pumps have been used 3 years and will run another year without new liners.	Hull was scraped and cleaned; caulked. Shaft was remetaled and stern bearing bushed. Dredge was docked twice during year, and remained on ways about 10 days. Parts of pump are of different ages, varying from 6 months to 14 months. Will run about 6 months.

Name	*Caucus.*	*Charleston.*	*Chinook.*[1]
1. District to which dredge belongs	Montgomery, Ala	Mobile, Ala	Second Portland, Oreg.
2. Where built	Greensport, L. I	Brooklyn, N. Y	Belfast, Ireland.
3. When built	1905	1891	1892.[2]
4. Builder	James Reilly Repair & Supply Co	Henry Lawrence	Harland & Wolfe.
5. Contract cost	$150,000	$65,000	Unknown.[3]
6. Cost of outfit	$26,000	$4,000 (approximate)	Do.[3]
7. Total first cost	$176,000	$69,000	Do.[3]
8. Present value	$100,000	$60,000	$374,400.
9. Time to build	2 years 7 months	9 months	(3).
10. Material of hull	Wood	Oak frames, oak and pine planking	Steel.
11. Length over all	200 feet	122 feet 6 inches	460 feet.
12. Length between perpendiculars	185 feet	117 feet	445 feet.
13. Beam	41 feet	30 feet	49 feet.
14. Depth amidship	23 feet 2 inches	19 feet 8 inches	34 feet.
15. Drafts, light:			
(a) Forward	13 feet 6 inches	10 feet 8 inches	17 feet 6 inches.
(b) Aft	14 feet 6 inches	12 feet 1 inch	Do.
16. Drafts, loaded:			
(a) Forward	19 feet 6 inches	15 feet 5 inches	24 feet.
(b) Aft	14 feet 6 inches	17 feet 1 inch	Do.
17. Displacement:			
(a) Light	1,980 tons	800 tons	7,400 tons.
(b) Loaded	3,180 tons	1,100 tons	12,500 tons.
18. Number of hoppers	2	2	2.
19. Total capacity of hoppers	977 cubic yards	312 cubic yards	3,500 cubic yards.
20. Number of drags	2	1	4.
21. Type of drag	Allen	Ordinary	New York flat.
22. Number, size, and type of—			
(a) Dredging pumps	Two 18-inch centrifugal	One 15-inch centrifugal, Edward make	Two 20-inch centrifugal and two 30-inch centrifugal.
(b) Pumping engines	Two 14 and 26 by 18 inch compound	1, fore-and-aft compound, 13 by 23 by 14 inch.	Two 13 and 20 and 31½ by 20 inch triple expansion and two 17 and 27½ and 42 by 20 inch triple expansion.
23. Revolutions per minute of pumping engines	185	225	150.
24. Total indicated horsepower of pumping engines	670	250	2,000.
25. Number, size, and type of propelling engines	One 22 and 44 by 30 inch compound	1, size 17 by 32 by 22 inches, steeple compound.	Two 22½ and 36½ and 60 by 48 inch triple expansion.
26. Revolutions per minute of propelling engines:			
(a) Light	88	120	70.
(b) Loaded	82	110	65.
(c) While dredging	82	75	55.
27. Total indicated horsepower of propelling engines	725	360	3,300.
28. Average speed:			
(a) Light	9 knots	7.75 knots	12 knots.
(b) Loaded	6 knots	5.8 knots	11 knots.
(c) While dredging	1 knot	2 knots	2 knots.
29. Number and type of boilers	2 Scotch marine	1 Scotch marine	2 double end and 2 single end Scotch marine.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Caucus.*		*Charleston.*				*Chinook.*
30. Dimensions of boilers:							
(*a*) Diameter	14 feet		13 feet				14 feet 1 inch.
(*b*) Length	12 feet		12 feet				Double end, 17 feet; single end, 9 feet 9 inches.
(*c*) Heating surface (total)	5,473 square feet		1,175 square feet				13,473 square feet.
(*d*) Grate surface (total)	147 square feet		72 square feet				18 oil burners; 18 furnaces of 43 inches each.
31. Boiler pressure (gauge)	120 pounds		100 pounds				145 pounds.
32. Number of men in crew	10		27				71.
33. Number of men required to operate dredge with single crew.	32		18				45.
OPERATIONS.							
34. Location of dredging	No dredging in Montgomery, Ala., district during the year.	Brunswick Harbor, Ga.	Mobile Bar, Ala.	Ship Island Pass, Miss.	Horn Island Pass, Miss.	Pascagoula Channel, Miss.	Columbia River Bar.
			Feet.	*Feet.*	*Feet.*	*Feet.*	
35. Depth at mean low water before dredging		20 to 22 feet	28-30	23.5-24	18-22	15-22	34 feet.
36. Depth at mean low water after dredging		22 to 24 feet	30-32	26	20-22	15-22	Minimum, 36 feet; maximum, 43 feet.
37. Character of dredged material		Sand, shell, and mud	Sand and mud				Sand.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.		101 (Brunswick Harbor).	878.75				731.
39. Total number of loads dredged during year		96 (Brunswick Harbor).	1,809				489.
40. Average distance from work to dump per load		1.05 miles	0.486 mile				1.495 miles.
41. Average number of loads dredged daily (counting days worked).		5.33	11.82				4.366.
42. Maximum amount in cubic yards dredged in 1 day		5,920	4,810				20,910.
43. Maximum amount in cubic yards per load		977	312				3,520.
44. Average amount in cubic yards per load		919	220.77				2,831.1.
45. Average amount in cubic yards dredged per hour pumping=Item 47÷Item 50 a.		824.5	474.24				1,491.31.
46. Maximum amount in cubic yards dredged per hour pumping.		1,067	925				2,898.
47. Total amount in cubic yards dredged during year		88,222 (Brunswick Harbor).	399,377[1]				1,384,405.
48. Maximum amount in cubic yards dredged in 1 month.		60,988	81,030				357,505.
49. Total amount in cubic yards dredged by this dredge in this locality.		88,222 (Brunswick Harbor).	399,377[1]				8,950,483.

DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:												
(a) Pumping	......	......	......	107	1	1.222	842	8	9.61	928	19	10.5972
(b) Turning in cut	......	......	......	1	6	.013	......	......	......	128	39	1.4680
(c) To and from dump	......	......	......	44	37	.509	335	.22	3.83	140	22	1.6023
(d) Dumping	......	......	......	11	30	.131	127	......	1.45	50	10	.5726
(e) Taking fuel and supplies	......	......	......	27	55	.319	184	......	2.10	8	45	.0999
(f) To and from wharf and anchorage	......	......	......	51	18	.586	442	43	5.05	289	......	3.3000
51. Time lost from work:												
(a) Bad weather	......	......	......	......	......	......	268	34	3.07	678	25	7.7444
(b) Ordinary repairs	......	......	......	70	7	.800	191	45	2.19	29	45	.3396
(c) Extraordinary repairs	......	......	......	24	......	.274	647	10	7.39	164	35	1.8788
(d) Alterations and additions	......	......	......	......	......	......	......	......	......	......	......	......
(e) Out of commission	5,088	......	72.85	......	......	......	936	......	[1] 10.68	2,640	......	30.1370
(f) Lying at berths nights and after working hours	......	......	......	370	50	4.233	3,237	18	36.96	892	20	10.1865
(g) Transferring from one district to another	......	......	......	360	......	4.110	......	......	......	......	......	......
(h) Miscellaneous	600	......	8.59	11	36	.132	......	......	......	1,873	40	21.3888
(i) Sundays and holidays	1,296	......	18.56	120	......	1.370	1,548	......	17.67	936	......	10.6849
52. Total number of hours in year	8,760	......	100.00	8,760	......	100.00	8,760	......	100.00	8,760	......	100.00
53. Total time at work	None.	......	......	243	27	2.780	1,931	13	22.04	1,545	15	......
54. Total time lost from work (exclusive of Sundays, holidays, and transfers, Item [51—(g+i)]	5,688	......	81.44	476	33	5.439	5,280	47	60.29	6,278	45	......

55. Number of days upon which any dredging was done	None	18	153	112.
56. Average number of working hours per day	......	13 hours 31 minutes	12 hours 37 minutes	13.797.
57. Maximum number of working hours per day	......	14 hours	16 hours 25 minutes	18.833.
58. Average time to dredge one load	......	1 hour 6.9 minutes	0.465 hour	1.90 hours.
59. Average time to dump one load	......	7.2 minutes	0.0702 hour	6.18 minutes.
60. Average time spent going to and from dump	......	26.8 minutes	0.185 hour	17.22 minutes.

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$6,730.94	47.29	$3,390.31	23.432	$16,475.83	48.44	$40,794.61	29.1552
62. Coal	2,262.57	15.90	4,475.03	30.929	2,493.59	7.33	361.70	.2585
63. Fuel oil	......	......	11.55	.080	......	......	50,754.34	36.2733
64. Water	242.98	1.71	228.63	1.580	50.20	.15	135.00	.0964
65. Supplies:								
(a) Subsistence	1,775.17	12.47	1,256.99	8.688	5,065.07	14.89	9,843.08	7.0347
(b) Engine room	613.60	4.31	783.66	5.416	950.73	2.79	2,874.05	2.0540
(c) Miscellaneous	......	......	166.69	1.152	676.39	1.99	2,516.69	1.7987
66. Renewals of or additions to outfit	......	......	319.75	2.210	831.68	2.44	2,657.29	1.8991

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name.	*Caucus.*				*Charleston.*		*Chinook.*	
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
67. Ordinary repairs:								
(a) Hull	138.57	0.97			378.41	1.11	770.03	0.5503
(b) Machinery	1,792.09	12.59			203.57	.60	1,188.93	.8497
68. Extraordinary repairs:								
(a) Hull					1,859.86	5.47	11,458.68	8.1894
(b) Machinery					1,188.95	3.50	5,268.60	3.7654
69. Alterations and additions:								
(a) Hull	33.00	.23			9.77	.03		
(b) Machinery					15.41	.05		
70. Laundry and miscellaneous expenses, wharfage, etc.	472.99	3.32	120.91	.836	353.46	1.04	562.61	.4021
71. Office expense	171.67	1.21	1,075.35	7.433	2,549.05	7.50	3,989.13	2.8510
72. Surveys and superintendence					907.53	2.67	6,747.27	4.8222
73. Rental			2,639.76	18.244				
Total cost	14,233.58	100.00	14,468.63	100.00	34,009.50	100.00	139,922.01	100.00
74. Operating cost for year	$12,098.25		$13,393.28		$26,896.95		$110,499.37.	
75. Cost per hour of time at work. Item 74÷Item 53.			$55.014		$13.927		$71.50.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.			$26,216.92		$73,545.42		$448,930.625.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.			15.180		6.735		7.9807.	
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.			362.4		206.80		895.91.	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost−(Items 67+68+69)]÷Item 47.			16.400		7.60		8.757.	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost−(Items 68+69)]÷Item 47.			16.400		7.746		8.899.	
81. Gross cost per cubic yard (cents). Total cost÷Item 47.			16.400		8.516		10.107.	
82. Total cost per yard mile (cents)			15.619		17.52		6.7605.	
MISCELLANEOUS.								
83. Fuel consumed during year (long ton or barrel)	550.5 tons		712.75 tons		998 short tons		36,718.45 barrels fuel oil.	
84. Average cost of fuel per long ton (or barrel)	$4.11 per ton		$6.278 per ton		$2.13 to $3.75 per short ton		$1.382 per barrel.	
85. Fuel consumed per yard of dredged material in pounds—Item 83÷Item 47.			18.09		4.998		8.514.	

86. Cost of water per 1,000 gallons	$1	$2.097	Flat rate	$5 delivered by barge.
87. Water purchased during year	242,980 gallons	109,000 gallons	186,628 gallons	27,000 gallons.
88. Total mileage of dredge during year	600	2,539	5,000	4,774 miles.
89. Maximum dredging depth	40 feet	40 feet	35 feet	59 feet, 20-inch pumps; 50 feet, 30-inch pumps.
90. Number of shifts worked per day	1 and 3, depending on conditions.	1 and 3, depending on conditions.	1	
91. Signal letters			G. W. M. B	
92. Wireless				
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	Age of present pump, 12 years. Transferred to the Savannah district for work at Brunswick, Ga.; left Pensacola Apr. 11 and returned June 1, 1917. Transferred to the Norfolk, Va., district; left Pensacola Dec. 9, 1917. No accidents. From Mar. 21 to 29, 1917, this dredge was engaged in towing the U. S. dredge Blackwater and attendant plant from St. Andrews Bay, Fla., to Pensacola, Fla., and from Oct. 3 to 22, 1917, was employed by the Navy Department in floating the U. S. S. Quincy. Owing to lack of funds, the dredge was tied up during the remainder of the year.	This dredge belongs to Montgomery, Ala., district; was rented by this district for work in Brunswick Harbor. Leaving Pensacola, Fla., Apr. 11, arriving at Brunswick, Ga., Apr. 17; working in Brunswick Harbor from Apr. 23 to May 23, 1917. Leaving Brunswick May 23, arriving at Pensacola May 30.	Extraordinary repairs to hull consists of removing sheathing and calking wells, renewing sheathing where necessary, new copper sheathing on rudder post, installing hinges on gates, repairs to guards, new wearing strips installed on timbers in wells, repairs to forward water tank, and replacing shoe. The dredge was docked twice during the year, from May 21 to June 11 for a period of 22 days, and from Oct. 3 to Nov. 5 for a period of 34 days. Present sand pump has been in use nearly 4 years and has no liners. [1] Mobile Bar, 104,916; Ship Island Pass, 225,320; Horn Island Pass, 53,946; Pascagoula Channel, 15,195. [2] Laid up on account of lack of funds.	*Extraordinary repairs.*—Hull: Repairs to bin gates and gate rods, gate and deck winches, trunnion pipe and bearing; renewals of 20-inch distributing valves, pipe-line and gangway davits; repairs and renewals to work benches, galley stove, and tiling in floor of pantry and galley. Machinery: Rebabbitted crank shaft bearings and renewed metallic packing; repairs and renewals to 20-inch and 30-inch pumps and engines, auxiliary pumps, and hot well; renewed stay tubes and stay bolts in boilers. The dredge was docked once during the year for a period of 3 days. Present age of 20-inch pumps, 14 years; 30-inch pumps, 4 years. Pumps will run without new liners for about 6 months when dredging 16 hours per day. The channel depth was increased from 37 feet to 40 feet over an area 1,000 feet in width. [1] Formerly United States transport Grant. [2] Transformed from transport to 20-inch dredge in 1903 by the Navy Department at a cost of $217,724.47. Remodeled at Portland, Oreg., in 1910 at an additional cost of $137,075. Two additional pumps, 30-inch, with machinery and auxiliaries were installed at Portland, Oreg., in 1914 at a cost of $107,588. [3] Transferred from Quartermaster Department to Engineer Department.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name.	*Clatsop.*	*Comstock.*	*Cumberland.*
1. District to which dredge belongs	Second Portland, Oreg	Galveston	Savannah, Ga.
2. Where built	Newport News, Va	Baltimore, Md	Belfast, Me.
3. When built	1908	1915	1902.
4. Builder	Newport News Shipbuilding Co	Ellicott Machine Corporation	Geo. A. Gilchrist.
5. Contract cost	$234,500	$210,433.68	$144,750.
6. Cost of outfit	Unknown	$3,512.07	$13,700.12.
7. Total first cost	$304,385	$213,945.75	$158,450.12.
8. Present value	$175,000	$208,000	$85,000.
9. Time to build	1 year and 4 months		1 year and 1 month.
10. Material of hull	Steel	Steel	Wood.
11. Length over all	180 feet	163 feet 9¾ inches	200 feet.
12. Length between perpendiculars	168 feet	155 feet	183 feet.
13. Beam	38 feet	35 feet	40 feet 8 inches.
14. Depth amidship	23 feet	17 feet	23 feet 6 inches.
15. Drafts, light:			
(*a*) Forward	12 feet	7 feet 3 inches	13 feet 5 inches.
(*b*) Aft	16 feet	11 feet 6 inches	14 feet 3 inches.
16. Drafts, loaded:			
(*a*) Forward	22 feet 4 inches	15 feet	20 feet 5 inches.
(*b*) Aft	20 feet 4 inches	14 feet 6 inches	19 feet 5 inches.
17. Displacement:			
(*a*) Light	1,360 tons	660 tons	1,905 tons.
(*b*) Loaded	3,158 tons	1,260 tons	3,597 tons.
18. Number of hoppers	2	2	2.
19. Total capacity of hoppers	1,130 cubic yards	490 cubic yards	970.29 cubic yards.
20. Number of drags	2	2	2.
21. Type of drag	New York flat	Ambrose Channel	One special design of Savannah Engineer office. One design, and patented by N. Long.
22. Number, size, and type of:			
(*a*) Dredging pumps	Two 18-inch centrifugal	Two 15-inch centrifugal	Two 18-inch centrifugal.
(*b*) Pumping engines	Two 12 and 26 by 18-inch compound	Two 11 and 22 by 14 inch vertical compound.	Two 14 and 26 by 16-inch compound.
23. Revolutions per minute of pumping engines	152	165	190.
24. Total indicated horsepower of pumping engines	500	450	540 on trial with 120 pounds steam.
25. Number, size, and type of propelling engines	One 20 and 44 by 30-inch compound	One 18 and 36 by 24 inch vertical compound.	One 22 and 44 by 30 inch compound.
26. Revolutions per minute of propelling engines:			
(*a*) Light	110	12–124	105.
(*b*) Loaded	100	115–118	79.
(*c*) While dredging	86	90–95	From 30 to 90.
27. Total indicated horsepower of propelling engines	900	650	835.15 on trial Mar. 17, 1907, with 122 pounds of steam and old propeller.

28. Average speed:				
(a) Light	7 knots	8 knots		10 knots.
(b) Loaded	5 knots	7 knots		8 knots.
(c) While dredging	2 knots	2 knots		1 to 2 knots.
29. Number and type of boilers	2 single-end; Scotch marine	2 Scotch marine		2 Scotch.
30. Dimensions of boilers:				
(a) Diameter	13 feet	11 feet		14 feet.
(b) Length	12 feet	12 feet		12 feet.
(c) Heating surface (total)	3,942 square feet	3,054 square feet		6,600 square feet.
(d) Grate surface (total)	6 oil burners; 6 furnaces of 44 inches each	128 square feet		136 square feet.
31. Boiler pressure (gauge)	135 pounds	150 pounds		120 to 125 pounds.
32. Number of men in crew	40	32		36.
33. Number of men required to operate dredge with single crew.	30	32		36.
OPERATIONS.				
34. Location of dredging	Lower Columbia River, Oreg. and Wash	Mouth of Brazos River, Tex.	Outer Bay, Galveston, Tex.	Savannah Harbor.
35. Depth at mean low water before dredging	21 feet	18.5	28½ feet	23 to 25 feet.
36. Depth at mean low water after dredging	Minimum, 26 feet; maximum, 30 feet	18.5	29 feet	24 to 27 feet.
37. Character of dredged material	Sand	Sand, silt, and mud	Sand, mud, and clay.	Sand, mud, and shell.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.	2,725.68	563½	129	2,587.
39. Total number of loads dredged during year	2,337	985	129	824.
40. Average distance from work to dump per load	1.161 miles	½ to 1 mile (¾ average).	1 mile	3.14 miles.
41. Average number of loads dredged daily (counting days worked).	8.058	5.44	5.16	3.45.
42. Maximum amount in cubic yards dredged in one day.	19,306	3,430	2,940	6,290.
43. Maximum amount in cubic yards per load	1,184	490	490	970.
44. Average amount in cubic yards per load	1,060.61	490	490	1,060 (by time pumping).
45. Average amount in cubic yards dredged per hour pumping=Item 47÷Item 50 a.	889.65	373.32	373.32	611.1.
46. Maximum amount in cubic yards dredged per hour pumping.	2,192	471.93	345	1,260.
47. Total amount in cubic yards dredged during year	2,478,648	545,860	545,860	873,931.
48. Maximum amount in cubic yards dredged in one month.	288,890	79,870	48,510	97,156.
49. Total amount in cubic yards dredged by this dredge in this locality.	17,642,991	482,650	63,210	9,963,727.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Clatsop.*			*Comstock.*			*Cumberland.*		
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50 Time at work:									
(*a*) Pumping	2,786	5	31.8046	1,462	11	16.69	1,430	16	16.327
(*b*) Turning in cut				42	10	.48	1	49	.021
(*c*) To and from dump	700	25	7.9956	393	18	4.49	573	13	6.543
(*d*) Dumping	382	5	4.3617	110	58	1.27	83	45	.956
(*e*) Taking fuel and supplies	357	35	4.0820	200	1	2.28	283	18	3.324
(*f*) To and from wharf and anchorage	156	25	1.7856	180	12	2.06	549	48	6.276
51. Time lost from work:									
(*a*) Bad weather	142	35	1.6277	223	36	2.55	38	54	.444
(*b*) Ordinary repairs	148	25	1.6942	66	5	.76	308		3.516
(*c*) Extraordinary repairs	17		.1940	1,688	20	19.27	191	25	2.185
(*d*) Alterations and additions									
(*e*) Out of commission									
(*f*) Lying at berths nights and after working hours	2,324	5	26.5307				3,859	32	44.60
(*g*) Transferring from one district to another				26		.30			
(*h*) Miscellaneous	377	20	4.3075	3,215	9	36.70			
(*i*) Sundays and holidays	1,368		15.6164	1,152		13.15	1,440		16.438
52. Total number of hours in year	8,760		100.00	8,760		100.00	8,760		100.00
53. Total time at work	4,382	35		2,388	50		2,922	9	33.357
54. Total time lost from work (exclusive of Sundays, holidays, and transfers) Item [51—(g+i)]	3,009	25		5,193	10		4,397	51	50.305

	Clatsop.	*Comstock.*	*Cumberland.*
55. Number of days on which any dredging was done	290	206	239.
56. Average number of working hours per day	15.111	11 hours 36 minutes	11 hours 49 minutes.
57. Maximum number of working hours per day	18.333	12	12 hours.
58. Average time to dredge one load	1.192 hours	1 hour 19 minutes	1 hour 44.1 minutes.
59. Average time to dump one load	9.78 minutes	5 minutes 57 seconds	6.1 minutes.
60. Average time spent going to and from dump	17.94 minutes	21 minutes 11 seconds	41.7 minutes.

	Clatsop.		*Comstock.*		*Cumberland.*	
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$32,135.59	34.1779	$24,827.20	26.11	$20,853.71	33.689
62. Coal	266.31	.2832	312.30	.33	17,500.72	28.271
63. Fuel oil	33,209.02	35.3195	24,084.26	25.32	72.83	.118

64. Water	120.00	.1276	510.57	.54	231.31	.374
65. Supplies:						
(a) Subsistence	8,027.18	8.5373	7,084.96	7.45	9,703.40	15.675
(b) Engine room	2,344.12	2.4931	2,937.26	3.09	1,215.93	1.964
(c) Miscellaneous	838.32	.8916	4,156.94	4.37	1,257.15	2.030
66. Renewals of or additions to outfit	555.07	.5903	2,853.76	3.00	1,848.64	2.986
67. Ordinary repairs:						
(a) Hull	1,608 40	1.7106	87.50	.09	58.53	.095
(b) Machinery	1,342.74	1.4281	65.70	.07	2,078.04	3.356
68. Extraordinary repairs:						
(a) Hull	355.34	.3780	7,323.04	7.70		
(b) Machinery	1,897.67	2.0183	11,973.03	12.59	1,204.34	1.945
69. Alterations and additions:						
(a) Hull			156.00	.16		
(b) Machinery			111.90	.12		
70. Laundry and miscellaneous expenses, wharfage, etc.	1,046.50	1.1130	391.80	.41	252.75	.408
71. Office expense	4,601.40	4.8939	6,000.97	6.31	5,627.73	9.089
72. Surveys and superintendence	5,676.86	6.0376	718.59	.76		
73. Rental			[1] 1,504.93	1.58		
Total cost	94,024.52	100.00	95,100.71	100.00	61,905.08	100.00
74. Operating cost for year	$78,542.11		$68,663.98		$52,936.44.	
75. Cost per hour of time at work. Item 74÷Item 53	$17.921		$28.7437 plus		$18.115.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.	$53,981 744		$149,270.82567 plus		$89,654.37.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.	3.169		0.12579 plus		6.057.	
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.	565.568		228.5048 plus		299.06.	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69)]÷Item 47.	3.583		0.13810 plus		6.701.	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69)]÷Item 47.	3.702		0.13838 plus		6.946.	
81. Gross cost per cubic yard (cents). Total cost÷Item 47.	3.793		0.17422 plus		7.084.	
82 Total cost per yard mile (cents)	3.267		0.23230 plus		2.256.	
MISCELLANEOUS.						
83. Fuel consumed during year (long ton or barrel)	28,332.80 barrels fuel oil		17,338.63 barrels, 5,565,700.23 pounds		3,594.02 tons.	
84. Average cost of fuel per long ton (or barrel)	$1.172 per barrel		$1.3890 plus per barrel		$4.869 per ton.	
85. Fuel consumed per yard of dredged material in pounds—Item 83÷Item 47.	3.669		10.1962 plus		9.21.	
86. Cost of water per 1,000 gallons	9.772cents		$0.848994 plus		$5.	
87. Water purchased during year	1,228,000 gallons		601,382 gallons		46,017 gallons.	
88. Total mileage of dredge during year	5,641		1,871		9,779.	
89. Maximum dredging depth	45 feet		35 feet		42 feet.	

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Clatsop.*	*Comstock.*	*Cumberland.*
90. Number of shifts worked per day	2	2	1.
91. Signal letters			
92. Wireless			
	Remarks.	*Remarks.*	*Remarks.*
	Extraordinary repairs.—Hull: Renewed pintle pins and davit springs, and straightened suction pipes. Machinery: Purchased 2 new runners, wearing rings, bolts, and nuts for main sand pumps. The dredge was not docked during the year. Present age of sand pumps, 9 years. Pumps will run without new liners for about 6 months when dredging 16 hours per day. The channel depth was increased 4½ feet to 6 feet over an area 400 feet in width.	The last dredging performed during 1917 was on Oct. 18. Dredge left Galveston at 5.20 p. m., Oct. 20, and arrived at New Orleans 12 p. m., Oct. 23, 1917. She went on dry dock at 11.15 a. m., Oct. 24, and came out of dry dock at 7.30 a. m., Nov. 2, 1917. Extraordinary repairs to dredge commenced Oct. 24. All old repairs were completed on Dec. 8. The oil tanker John D. Rockefeller rammed port side of dredge while tied at dock in New Orleans, at 5.35 p. m., Nov. 15, causing $17,879 damages to dredge, and causing her to be laid up until Jan. 2, 1918, on which date repairs account damages were completed. It was necessary to dock dredge again. She went in dry dock at 7 a. m. on Dec. 20, and came out of dock at 3 p. m., Dec. 21. [1] Fort Point Depot charges.	Repairs to rudder, and cleaning and painting hull. One docking. Age of present sand pumps, 2 years an 3 months. Pump should run 1 year without new liners. Work during calendar year has been mainly the maintenance of channel.

Name	*Delaware.*	*Galveston.*	*Key West.*
1. District to which dredge belongs	Philadelphia, Pa.	Galveston.	Jacksonville, Fla.
2. Where built	Sparrows Point, Md.	Sparrows Point, Md.	Belfast, Me.
3. When built	1905.	1908.	1904.
4. Builder	Maryland Steel Co.	Maryland Steel Co.	Geo. A. Gilchrist.
5. Contract cost	$358,400.	$357,500.	$91,000.
6. Cost of outfit	$33,734.	$22,935.35.	$10,708.
7. Total first cost	$392,134.	$380,435.	$101,708.
8. Present value	$194,600.	$295,000.	$58,000.
9. Time to build	26 months.	1 year and 2 months.	1 year 5 months.
10. Material of hull	Steel.	Steel.	Wood.
11. Length over all	315 feet.	304 feet.	142 feet.
12. Length between perpendiculars	300 feet.	290 feet.	131 feet.
13. Beam	52 feet.	51 feet.	31 feet 7 inches.
14. Depth amidship	22 feet 6 inches.	27 feet.	14 feet 8 inches.
15. Drafts, light:			
(*a*) Forward	11 feet 10 inches.	9 feet 6 inches.	11 feet 8 inches.
(*b*) Aft	12 feet 6 inches.	13 feet 6 inches.	11 feet 6 inches.
16. Drafts, loaded:			
(*a*) Forward	18 feet 11 inches.	18 feet 5 inches.	17 feet.
(*b*) Aft	17 feet 7 inches.	21 feet 6 inches.	15 feet.
17. Displacement:			
(*a*) Light	4,200 tons.	3,375 tons.	1,000 tons.
(*b*) Loaded	6,440 tons.	7,290 tons.	1,600 tons.
18. Number of hoppers	2.	2.	2.
19. Total capacity of hoppers	3,147 cubic yards.	2,850 cubic yards.	369 cubic yards.
20. Number of drags	2.	2.	1.
21. Type of drag	New York.	Bucyrus, Ambrose Channel.	Allen.
22. Number, size, and type of—			
(*a*) Dredging pumps	Two 20-inch centrifugal.	2 cast steel, 20-inch, centrifugal.	One 15-inch Morris, centrifugal.
(*b*) Pumping engines	Two 16 and 32 by 18 inch, compound.	Two 17 and 26 by 18 inch, vertical compound.	One 12 by 22 by 14 inch, compound.
23. Revolutions per minute of pumping engines	162.	176.	210.
24. Total indicated horsepower of pumping engines	630.	1,124.48.	190.
25. Number, size, and type of propelling engines	Two 22 and 44 by 30 inch, compound.	Two 22 and 46 by 30 inch, vertical compound.	One 17.5 and 32 by 14 inch, compound.
26. Revolutions per minute of propelling engines:			
(*a*) Light	106.	118.	106.
(*b*) Loaded	96.	118.	102.
(*c*) While dredging	0 to 60.	25 to 118.	106 to 70.
27. Total indicated horsepower of propelling engines	1,426.	1,983.	360.
28. Average speed:			
(*a*) Light	9 knots.	10 knots.	7 knots.
(*b*) Loaded	6 knots.	9 knots.	5 knots.
(*c*) While dredging	1 to 2 knots.	1 knot.	2 knots.
29. Number and type of boilers	4 Scotch marine return tubular.	4 Scotch, return tubular.	1 Scotch water back.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Delaware.*	*Galveston.*		*Key West.*
30. Dimensions of boilers:				
(a) Diameter	14 feet	14 feet 6 inches		16 feet 6 inches.
(b) Length	12 feet	12 feet		12 feet.
(c) Heating surface (total)	10,680 square feet	10,702 square feet		1,740 square feet.
(d) Grate surface (total)	280 square feet	275 square feet		72.5 square feet.
31. Boiler pressure (gauge)	118 pounds	145 pounds		111 pounds.
32. Number of men in crew	60	42		23.
33. Number of men required to operate dredge with single crew.	30	42		23
OPERATIONS.		Channel and bar, Port Aransas, Tex.	Galveston, Tex.	
34. Location of dredging	Delaware River; Philadelphia Harbor and below.			Entrance to St. Johns River, Fla.
35. Depth at mean low water before dredging	28 to 30 feet	29 feet	29 feet	15 to 25 feet.
36. Depth at mean low water after dredging	30 to 33 feet	25 feet	30 feet	27 to 30 feet.
37. Character of dredged material	Mud, sand, gravel, and clay	Dark, coarse sand	Sand, mud, and silt.	Sand.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.	5,085	99	74	2,434.
39. Total number of loads dredged during year	443	99	74	957.
40. Average distance from work to dump per load	11 miles	1 mile	1 mile	2.54 miles.
41. Average number of loads dredged daily (counting days worked).	2	5.21	2.55	4.85.
42. Maximum amount in cubic yards dredged in 1 day.	32,965	11,478	8,384	2,214.
43. Maximum amount in cubic yards per load	3,126	1,270	2,807	369.
44. Average amount in cubic yards per load	2,295	1,272	2,752	341.
45. Average amount in cubic yards dredged per hour pumping=Item 47÷Item 50a.	1,331	1,228.19	1,228.19	308.5.
46. Maximum amount in cubic yards dredged per hour pumping.	2,000	1,675	1,112	410.
47. Total amount in cubic yards dredged during year	4,079,669	125,922 (329,562)	203,640	326,264.
48. Maximum amount in cubic yards dredged in 1 month.	570,035	117,575		44,099.
49. Total amount in cubic yards dredged by this dredge in this locality.	44,845,039	125,922	203,640	1,810,429.

DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:									
(a) Pumping	2,313	39	26.40	268	20	3.13	1,057	20	12.060
(b) Turning in cut	252	15	2.88				79	40	.918
(c) To and from dump	1,450	29	16.55	114	55	1.34	906	30	10.328
(d) Dumping	103	46	1.19	20	40	.24	83	40	.958
(e) Taking fuel and supplies	368	5	4.20	56	15	.66	8	40	.109
(f) To and from wharf and anchorage	356	35	4.07	24	15	.28	204	40	2.239
51. Time lost from work:									
(a) Bad weather	250	44	2.86	221	30	2.59	297	5	3.489
(b) Ordinary repairs	1,544	21	17.63				42	50	.491
(c) Extraordinary repairs	62	30	.72	336		3.93	1,574	45	17.981
(d) Alterations and additions				200		2.33			
(e) Out of commission				5,848		68.25			
(f) Lying at berths nights and after working hours							1,025	15	11.705
(g) Transferring from one district to another				41		.48			
(h) Miscellaneous	629	36	7.19	957	5	11.17	2,065	35	23.562
(i) Sundays and holidays	1,428		16.31	480		5.60	1,416		16.160
52. Total number of hours in year	8,760		100.00	8,760		100.00	8,760		100.00
53. Total time at work	4,844	49		484	25	5.65	2,340	30	26.612
54. Total time lost from work (exclusive of Sundays, holidays, and transfers). Item [51−(g+i)]	2,487	11		7,562	35	88.27	5,003	30	57.090

55. Number of days upon which any dredging was done	221	48	197.
56. Average number of working hours per day	21 hours 54 minutes	10 hours 5 minutes	11 hours 48 minutes.
57. Maximum number of working hours per day	24	12	13 hours.
58. Average time to dredge one load	5 hours 14 minutes	1 hour 33 minutes	1 hour 6 minutes.
59. Average time to dump one load	14 minutes	7 minutes 8 seconds	5.2 minutes.
60. Average time spent going to and from dump	3 hours 16 minutes	39 minutes 50 seconds	56.4 minutes per load.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Delaware.*		*Galveston.*		*Key West.*	
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$43,261.60	37.62	$19,334.84	22.56	$15,705.10	25.4702
62. Coal	29,178.89	25.37	72.40	.08	11,870.80	19.2929
63. Fuel oil			18,379.53	21.45		
64. Water			447.08	.52	90.25	.1433
65. Supplies:						
(a) Subsistence	12,044.86	10.47	5,239.22	6.12	4,598.19	7.4101
(b) Engine room	1,923.19	1.67	3,336.68	3.89	171.38	.2762
(c) Miscellaneous	1,169.76	1.02	3,806.12	4.44	1,401.36	2.1583
66. Renewals of or additions to outfit	1,916.30	1.67	707.50	.83	5,083.11	8.1906
67. Ordinary repairs:						
(a) Hull	753.68	.66	448.23	.52	21.45	.0246
(b) Machinery	194.52	.17	944.75	1.10	656.58	1.0580
68. Extraordinary repairs:						
(a) Hull	3,914.98	3.40	9,521.24	11.11	9,936.64	16.0132
(b) Machinery	6,759.27	5.88	11,217.14	13.10	6,120.12	9.7628
69. Alterations and additions:						
(a) Hull	10.00	.01				
(b) Machinery	861.00	.74			1,037.32	1.6616
70. Laundry and miscellaneous expenses, wharfage, etc.	333.66	.29	402.83	.47	999.52	1.5106
71. Office expense	5,230.34	4.55	3,485.67	4.07	2,410.00	3.8838
72. Surveys and superintendence	7,457.68	6.48	8,344.54	9.74	1,950.81	3.1440
Total cost	115,009.73	100.00	85,687.77	100.00	62,052.73	
74. Operating cost for year	$69,282.26		$33,961.57		$49,919.81.	
75. Cost per hour of time at work. Item 74×Item 53.	$18.53		$70.1081		$21.32.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.	$46,087.52		$530,198.34625 plus		$106,674.62.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.	2.2		0.10305 plus		15.39.	
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.	842		680.327 plus		138.5.	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost−(Items 67+68+69)]÷Item 47.	2.51		0.067153 plus		13.26.	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost−(Items 68+69)]÷Item 47.	2.54		0.062927 plus		13.47.	
81. Gross cost per cubic yard (cents). Total cost÷Item 47.	2.82		0.260004 plus		19.019.	
82. Total cost per yard mile (cents)	0.26		0.260004 plus		7.49.	

MISCELLANEOUS.			
83. Fuel consumed during year (long ton or barrel)	6,524.5 tons	11,770.32 barrels, 3,778,272.72 pounds	1,824.7 tons.
84. Average cost of fuel per long ton (or barrel)	$4.47	$1.56151 plus	$6.505 per ton.
85. Fuel consumed per yard of dredged material in pounds—Item 83÷Item 47.	3.59	11.4645 plus	13.2.
86. Cost of water per 1,000 gallons		$0.406986	25 cents.
87. Water purchased during year		1,098,514 gallons	361,500 gallons.
88. Total mileage of dredge during year	16,895	3,684	5,168.
89. Maximum dredging depth	45 feet	50 feet	42 feet.
90. Number of shifts worked per day	3 shifts, 8 hours each	2	1 shift (12 hours).
91. Signal letters			
92. Wireless			
	Remarks.	*Remarks.*	*Remarks.*
	The dredge worked on Mifflin, Bellevue, Cherry Island, Liston, New Castle, Deep Water Point, and Marcus Hook ranges; on the basin at Artificial Island; and in Philadelphia Harbor. Of the material removed 1,016,736 cubic yards were dumped in a depositing basin and pumped ashore by a rehandling machine, and 3,062,933 cubic yards were pumped directly overboard on ebb tide. *Extraordinary repairs.*—Renew bin gates and rods; calk, rivet, and paint hull; rebush rudder gudgeons; repairs to boilers; main air pump cylinders bored; and miscellaneous repairs. Number of times docked, one. Age of present sand pump, 9 years. Length of time pump will run with new liners, 1 year.	Transferred to Norfolk district on Dec. 24, 1917. The last dredging performed by the Galveston during 1917 was in Galveston Channel on Mar. 16, 1917. She was laid up after that date account no dredging to be done. Dredge departed for New Orleans, La. (to go on dry dock and undergo extraordinary repairs), at 2 p. m., Dec. 2, 1917, and arrived at New Orleans at 7 p. m., Dec. 7. Dredge went into dry dock at 12.45 p. m., Dec. 5 and came out of dry dock on Dec. 10, 1917. Extraordinary repairs were started on Dec. 5 and completed Dec. 19. The dredge departed from New Orleans for Norfolk on Dec. 24, 1917.	The dredge was under repair Jan. 28 to Mar. 27, the principal item being renewing forward sand bin. The dredge was on dock from Feb. 1 to Mar. 21, and Apr. 26 to May 3. The pump is about 13 years old and will run about 9 months with present liners.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Manhattan.*	*Meade, Gen. G. G.*	*Michie, Col. P. S.*
1. District to which dredge belongs	Philadelphia, Pa.	Grand Rapids, Mich	First Portland, Oreg.
2. Where built	Sparrows Point, Md	Sparrows Point, Md	Seattle, Wash.
3. When built	1904	1904	1912-13.
4. Builder	Maryland Steel Co.	Maryland Steel Co.	Seattle Construction & Dry-dock Co.
5. Contract cost	$304,000	$165,000	$325,598.
6. Cost of outfit	$37,577.24	$12,953	$52,600.
7. Total first cost	$341,577.24	$177,953	$378,198.
8. Present value	$172,000	$142,000	$365,000.
9. Time to build	15 months	1 year 3 months	16 months.
10. Material of hull	Steel	Steel	Steel.
11. Length over all	288 feet	177 feet	244 feet 6 inches.
12. Length between perpendiculars	274 feet	166 feet	230 feet.
13. Beam	47 feet 6 inches	38 feet	43 feet.
14. Depth amidship	25 feet	19 feet	20 feet.
15. Drafts, light:			
(*a*) Forward	10 feet 6 inches	9 feet	9 feet.
(*b*) Aft	12 feet 6 inches	12 feet	11 feet.
16. Drafts, loaded:			
(*a*) Forward	16 feet	19 feet	17 feet.
(*b*) Aft	17 feet 6 inches	17 feet	Do.
17. Displacement:			
(*a*) Light	4,000 tons	1,458 tons	1,526.092 tons.
(*b*) Loaded	5,670 tons	2,596 tons	3,353.922 tons.
18. Number of hoppers	2	2	6.
19. Total capacity of hoppers	2,476 cubic yards	935 cubic yards	1,280 cubic yards.
20. Number of drags	2	2	1.
21. Type of drag	New York		New York.
22. Number, size, and type of—			
(*a*) Dredging pumps	Two 20-inch centrifugal	Two 15-inch centrifugal	One 26-inch centrifugal.
(*b*) Pumping engines	Two 16 and 32 by 18 inch, compound.	Two 12 and 22 by 14 inch, compound.	12 by 20 by 33 inch, 24-inch stroke.
23. Revolutions per minute of pumping engines	160	230	130 (triple expansion).
24. Total indicated horsepower of pumping engines	670	400	780.
25. Number, size, and type of propelling engines	Two 22 and 44 by 30 inch, compound.	Two 15 and 30 by 24 inch, compound.	Two 16 by 32 inch, 24-inch stroke, fore and aft compound condensing.
26. Revolutions per minute of propelling engines:			
(*a*) Light	104	110	138.
(*b*) Loaded	98	100	120.
(*c*) While dredging	0 to 60	60	120.
27. Total indicated horsepower of propelling engines	1,390	731	1,400.
28. Average speed:			
(*a*) Light	9 knots	8.5 knots	9 knots.
(*b*) Loaded	7.3 knots	7 knots	6 knots.
(*c*) While dredging	2.5 knots	1.5 knots	1½ knots.

29. Number and type of boilers	4 Scotch marine return tubular	2 Scotch	Two Ballin water tube.	
30. Dimensions of boilers:				
(*a*) Diameter	14 feet	12 feet	3 feet.	
(*b*) Length	12 feet	13 feet	16 feet 10½ inches.	
(*c*) Heating surface (total)	10,704 square feet	4,124 square feet	9,100 square feet.	
(*d*) Grate surface (total)	280 square feet	125 square feet	None.	
31. Boiler pressure (gauge)	116 pounds	125 pounds	225 pounds.	
32. Number of men in crew	60	33	34.	
33. Number of men required to operate dredge with single crew.	30	33	27.	
OPERATIONS.				
34. Location of dredging	Delaware River below Philadelphia, Pa.	Harbors on east shore Lake Michigan.	Coos Bay Bar, Oreg.	Columbia River (Flavel Shoal), Oreg.
35. Depth at mean low water before dredging	28 to 30 feet	13 to 17 feet	21 feet	27 feet, shoal 1; 27 feet, shoal 2.
36. Depth at mean low water after dredging	30 to 33 feet	15 to 21 feet	34 feet	28 feet, shoal 1; 30 feet, shoal 2.
37. Character of dredged material	Mud, sand, and clay	Sand, clay, and gravel	Sand	Sand and mud.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.	3,253	482	887	840.
39. Total number of loads dredged during year	408	482	887	143.
40. Average distance from work to dump per load	8 miles	1 mile	1 mile	5.9 miles.
41. Average number of loads dredged daily (counting days worked).	2	3.3	7.1	4.9.
42. Maximum amount in cubic yards dredged in one day.	36,035	3,820	19,123	8,946.
43. Maximum amount in cubic yards per load	1,898	935	1,278	1,278.
44. Average amount in cubic yards per load	1,765	686	1,232	1,254.
45. Average amount in cubic yards dredged per hour pumping=Item 47÷Item 50a.	1,728	340.6	1,825	1,507.
46. Maximum amount in cubic yards dredged per hour pumping.	2,000	666	2,322	2,070.
47. Total amount in cubic yards dredged during year	3,616,468	330,675	1,093,008	179,355.
48. Maximum amount in cubic yards dredged in one month.	580,716	60,752	313,890	156,351.
49. Total amount in cubic yards dredged by this dredge in this locality.	30,871,378	4,701,479	3,668,841	179,355.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Manhattan.*			*Meade, Gen. G. G.*			*Michie, Col. P. S.*					
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:												
(a) Pumping	2,092	10	23.89	970	45	11.10	599	19	7.71	119		12.09
(b) Turning in cut	258	45	2.96	3	40	.04	7	30	.10	1	35	.16
(c) To and from dump	933	15	10.65	111	20	1.20	236	21	3.04	198	39	20.19
(d) Dumping	70	25	.80	49	45	.56	119	9	1.53	20	14	2.06
(e) Taking fuel and supplies	149	35	1.71	320	30	3.66	94	9	1.21	25	23	2.58
(f) To and from wharf and anchorage	361	20	4.12	73	45	.84						
51. Time lost from work:												
(a) Bad weather	96	20	1.10	102	50	1.17	396	11	5.09	64	17	6.53
(b) Ordinary repairs	1,609	5	18.37	20	50	.23	36	33	.46	28	19	2.88
(c) Extraordinary repairs	808		9.22	33	55	.40						
(d) Alterations and additions												
(e) Out of commission				[1] 1,344		15.26	1,848		23.77			
(f) Lying at berths nights and after working hours				[2] 5,249		60.00	1,918	3	24.67	303	4	30.80
(g) Transferring from one district to another							24		.30	24		2.44
(h) Miscellaneous	989	5	11.29	138	40	1.58	1,176	45	15.13	7	29	.76
(i) Sundays and holidays	1,392		15.89	341		3.90	1,320		16.99	192		19.51
52. Total number of hours in year	8,760		100.00	8,760		100.00	8,760		100.00	8,760		100.00
53. Total time at work	3,865	30		1,529	45	17.40	1,056	28		364	51	
54. Total time lost from work (exclusive of Sundays, holidays, and transfers) Item [51—(g+1)]	3,502	30		6,889	15	78.60	5,375	32		403	9	
55. Number of days upon which any dredging was done	190			144			125			29.		
56. Average number of working hours per day	20 hours 20 minutes			6 hours 51 minutes (pumping)			7.7			12.6.		
57. Maximum number of working hours per day	24			8 hours (pumping)			16			16.8.		
58. Average time to dredge one load	5 hours 8 minutes			2 hours			40.4 minutes			49.9 minutes.		
59. Average time to dump one load	10 minutes			6 minutes			8 minutes			8.5 minutes.		
60. Average time spent going to and from dump	2 hours 17 minutes			14 minutes			18 minutes			83.3 minutes.		

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$43,050.41	33.69	$21,717.67	38.52	$28,088.06	44.35	$3,710.18	23.68
62. Coal	24,438.35	19.12	14,914.17	26.33	523.75	.83		
63. Fuel oil					17,780.54	28.07	5,044.50	32.19
64. Water					34.29	.05		
65. Supplies:								
(a) Subsistence	12,033.96	9.42	5,402.58	9.54	6,684.93	10.55	800.10	5.11
(b) Engine room	2,299.86	1.80	626.42	1.15	1,430.44	2.26	348.83	2.23
(c) Miscellaneous	1,224.28	.96	704.75	1.25	937.93	1.48	186.70	1.19
66. Renewals of or additions to outfit	1,425.45	1.12	838.10	1.48	1,473.48	2.33	59.92	.38
67. Ordinary repairs:								
(a) Hull	2,437.96	1.91	187.67	.33	2,226.38	3.52	72.30	.46
(b) Machinery	855.46	.67	2,386.97	4.21	1,154.00	1.82	58.14	.37
68. Extraordinary repairs:								
(a) Hull	5,449.66	4.26	305.10	.54				
(b) Machinery	12,556.83	9.83	3,945.93	6.96	225.00	.36		
69. Alterations and additions:								
(a) Hull	3,013.23	2.36						
(b) Machinery	6,046.26	4.73						
70. Laundry and miscellaneous expenses, wharfage, etc.	270.39	.21	556.48	.98	1,048.81	1.66	15.82	.10
71. Office expense	5,230.35	4.09	1,912.06	3.37	1,454.94	2.29	205.98	1.31
72. Surveys and superintendence	7,457.69	5.83	3,132.44	5.53	274.67	.43		
73. Rental							5,168.87	32.98
Total cost	127,790.14	100.00	56,630.34	100.00	63,337.22	100.00	15,671.29	100.00
74. Operating cost for year	$84,742.70		$44,760.17		$58,002.23[1]		$25,334.92.[1]	
75. Cost per hour of time at work. Item 74÷Item 53	$21.92		$29.27		$54.90		$42.03.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.	$76,774.80		$201,709.92		$295,114.95		$16,944.39.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.	2.3		13.5		0.053		0.0855.	
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.	935		216.2		1,035		491.6.	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69)÷Item 47.	2.69		15		0.0546		0.0866.	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69)]÷Item 47.	2.78		15.5		0.0577		0.0874.	
81. Gross cost per cubic yard (cents). Total cost÷Item 47.	3.53		17.1		0.0579		0.0874.	
82. Total cost per yard mile (cents)	0.44		17.1		0.0579.		0.0148.	

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Manhattan.*	*Meade, Gen. G. C.*	*Michie, Col. P. S.*	
MISCELLANEOUS.				
83. Fuel consumed during year (long ton or barrel)	5,491 tons	2,087 tons	65 short tons; 13,808.81 barrels	3,550.81 barrels.
84. Average cost of fuel per long ton (or barrel)	$4.47	$7.146	$8.058 per ton; $1.29 per barrel	$1.60 per barrel.
85. Fuel consumed per yard of dredged material in pounds—Item 83÷Item 47.	3.4	12.5	4.17	6.35.
86. Cost of water per 1,000 gallons			$0.20	
87. Water purchased during year			171,419 gallons	83,000 gallons.
88. Total mileage of dredge during year	13,359		8,125	2,566.
89. Maximum dredging depth	45 feet	35 feet	35 feet	
90. Number of shifts worked per day	3 shifts (8 hours each)	1	2	
91. Signal letters				
92. Wireless			Yes	
	Remarks. The dredge worked on Deep Water Point, New Castle, Baker, Cherry Island, Marcus Hook, Liston, and Bellevue Ranges, and on the basin at Artificial Island. Of the material removed, 720,421 cubic yards were dumped in a depositing basin and pumped ashore by a rehandling machine and 2,896,047 cubic yards were pumped directly overboard on ebb tide. *Extraordinary repairs.*—Discharge elbows renewed; hull and hold cleaned and painted; sleeves on tail shafts renewed and bearings rebabbitted; main and hoisting engines repaired; boilers repaired; and other miscellaneous repairs. (Also includes preparation for installing experimental drag.) Number of times docked, 2.	*Remarks.* The Meade was employed at 7 different harbors having projects depths varying from 16 to 20 feet. Some of the harbors have different project depths in different portions. In each case the work done is restoring navigable depths upon the entrance bar in Lake Michigan, between the entrance piers, or in the interior river channel, where shoaling has occurred. Depths in excess of those of the projects are produced and fan-shaped areas are dredged on entrance bars to allow for shoaling during navigation season. Of the 330,675 cubic yards dredged during the year, 89,431 cubic yards were from the entrance bars in Lake Michigan, this dredging taking the place of further pier extension, which otherwise would be required on ac-	*Remarks.* *Extraordinary repairs.*—Renewing water cylinders to boiler feed pump. Number of times docked, 2. Age of present pump, 4 years. Transferred to second district, Portland, Oreg., Nov. 21, 1917. [1] Jan. 1 to Nov. 1.	*Remarks.* [1] Nov. 21 to Dec. 31

Age of present pumps, 8.5 years and 3.5 years. New liners required every year.	count of the advancing shore line. *Extraordinary repairs.*—Hull: Consisted of repairs to drag gear, cabin deck, and siding. Machinery. Consisted of new propeller shafts, swivel pipes, bronze sleeves for centrifugal pump, 4 discharge pipes, and installing propeller shafts in dry dock. Pump 14 years of age, liners last 3 years. Docked once; in dock 5 days. On Apr. 24 the Crosby Transportation Co. steamer Holland collided with the Meade, striking her on the port side aft, bending two frames and causing other damage. [1] This is 168 days (Jan. 1–Apr. 17, and Nov. 1–Dec. 31) at 8 hours while dredge was in winter quarters. [2] This is 168 days at 16 hours and 197 days at 13 hours.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Minquas.*	*Navesink.*	*New Orleans.*
1. District to which dredge belongs	Wilmington, Del.	Newport, R. I.	New Orleans, La.
2. Where built	Baltimore, Md	Sparrows Point, Md	Quincy, Mass.
3. When built	1915	1908	1912.
4. Builder	Spedden Shipbuilding Co	Maryland Steel Co	Fore River Ship Building Co.
5. Contract cost	$188,705.33	$371,425	$518,300.
6. Cost of outfit	$5,234.19	$12,704.28	$1,801.69.
7. Total first cost	$193,939.52	$384,129.28	$520,101.69.
8. Present value	$174,545.57	$280,000	$460,000.
9. Time to build	1 year 9 months and 8 days	10 months	18 months.
10. Material of hull	Steel	Steel	Steel.
11. Length over all	152 feet	290 feet	315 feet.
12. Length between perpendiculars	147 feet	276 feet	300 feet.
13. Beam	30 feet	47 feet 6 inches	50 feet.
14. Depth amidship	12 feet	28 feet	26 feet.
15. Drafts, light:			
(*a*) Forward	5 feet 2 inches	13 feet	14 feet 3 inches.
(*b*) Aft	12 feet 6 inches	14½ feet	16 feet 3 inches.
16. Drafts, loaded:			
(*a*) Forward	11 feet 8 inches	22 feet 6 inches	23 feet 6 inches.
(*b*) Aft	12 feet 8 inches	24 feet 4 inches	24 feet 7 inches.
17. Displacement:			
(*a*) Light	705 tons	3,150 tons	4,775 tons.
(*b*) Loaded	1,105 tons	6,517 tons (average load)	7,940 tons.
18. Number of hoppers	2	2	One.
19. Total capacity of hoppers	416 cubic yards	2,884 cubic yards	3,102 cubic yards.
20. Number of drags	1	2	One.
21. Type of drag	Fruhling	Removable flat bottom	Fruhling type.
22. Number, size, and type of—			
(*a*) Dredging pumps	One 16-inch (4 feet 6 inches diameter impeller) Fruhling.	Two 20-inch centrifugal, closed runner.	Two 26-inch centrifugal.
(*b*) Pumping engines	One 12 and 24 by 16 inch stroke, compound.	Two 17-inch and 36 by 18 inch, compound.	Two 12, 19 and 32 by 24 inch vertical marine triple expansion.
23. Revolutions per minute of pumping engines	230 dredging; 240 discharging	150-155	156.
24. Total indicated horsepower of pumping engines	221	781; test 114 pounds steam	1,230.
25. Number, size, and type of propelling engines	Two 12 and 24 by 16 inch stroke, compound.	Two 22 and 46 by 30 inch, compound	Two 12, 19 and 32 by 24 inch vertical marine triple expansion.
26. Revolutions per minute of propelling engines:			
(*a*) Light	135	108	110.
(*b*) Loaded	130	105	90.
(*c*) While dredging	90	0 to 90	40.
27. Total indicated horsepower of propelling engines	Starboard 211, port 218; total 429	1,589 (test 114 pounds steam)	820 at 100 revolutions.

28. Average speed:			
(a) Light	7 knots	10 knots	8 knots.
(b) Loaded	6 knots	7 knots	6 knots.
(c) While dredging	1 knot	½ to 2½ knots	0.5 knot.
29. Number and type of boilers	1 Scotch marine	4 Scotch marine	4 Babcock & Wilcox semimarine water tube.
30. Dimensions of boilers:			
(a) Diameter	14 feet 6 inches	14 feet 6 inches	13 feet 6 inches (length).
(b) Length	11 feet	12 feet	12 feet 4½ inches (width).
(c) Heating surface (total)	2,110.6 square feet	10,460 square feet	12,664 square feet.
(d) Grate surface (total)	67.5 square feet	273 square feet	317 square feet.
31. Boiler pressure (gauge)	135 pounds, average (150 highest point).	114	200 pounds.
32. Number of men in crew	21	63–64	56.
33. Number of men required to operate dredge with single crew.	21	48–49 (8 hours)	56 (16 hours).
OPERATIONS.			
34. Location of dredging	Wilmington Harbor	Pollock Rip Channel, Mass., Jan. 1 to June 30; out of commission July 1 to Nov. 30; left district Nov. 30, 1917.	Head of Passes and Southwest Pass, Mississippi River.
35. Depth at mean low water before dredging	15 feet	17–30 feet	
36. Depth at mean low water after dredging	18 to 20 feet	25–30 feet	
37. Character of dredged material	Mud and gravel	90–95 per cent sand, 10–15 per cent gravel and small stone.	Fine sand, silt, and mud.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.	1,074.6	2,009	3,975.
39. Total number of loads dredged during year	1,451	287	1,440.
40. Average distance from work to dump per load	⅝ mile	7 miles	2.75 miles.
41. Average number of loads dredged daily (counting days worked).	5.9	4.16	7.
42. Maximum amount in cubic yards dredged in one day.	2,250	17,791	26,354.
43. Maximum amount in cubic yards per load	250	2,595	2,635.
44. Average amount in cubic yards per load	232.9	2,100	1,532.
45. Average amount in cubic yards dredged per hour pumping = Item 47 ÷ Item 50 a.	440.9	1,487	1,739.
46. Maximum amount in cubic yards dredged per hour pumping.	1,500	2,406	9,112.
47. Total amount in cubic yards dredged during year	337,925	602,786	2,205,601.
48. Maximum amount in cubic yards dredged in one month.	43,425	174,729	338,658.
49. Total amount in cubic yards dredged by this dredge in this locality.	800,875	3,484,745	10,461,269 at Southwest Pass, 27,279 at South Pass, 57,308 at head of passes.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Minquas.*			*Navesink.*			*New Orleans.*		
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:									
(a) Pumping	766	20	8.75	405	20	5.07	1,268	40	14.5
(b) Turning in cut	16	30	.19	38	25	.48	1	20	.02
(c) To and from dump	730	35	8.33	447	30	5.54	787	5	8.98
(d) Dumping	447	40	5.11	47	50	.60	231	55	2.6
(e) Taking fuel and supplies	263	55	3.02	264	20	3.30	234	20	2.8
(f) To and from wharf and anchorage	219		2.50	437	35	5.46	331	27	3.8
51. Time lost from work:									
(a) Bad weather	102	35	1.17	873	10	10.88	185	52	2.1
(b) Ordinary repairs	66		.76	213	5	2.66			
(c) Extraordinary repairs	206	20	2.36	72	55	.92	475	33	5.4
(d) Alterations and additions									
(e) Out of commission				3,072		38.35			
(f) Lying at berths nights and after working hours	4,148		47.36	428	10	5.35	3,604	14	41.2
(g) Transferring from one district to another									
(h) Miscellaneous	339	5	3.85	460	30	5.74	337	33	3.8
(i) Sundays and holidays	1,454		16.60	1,255	10	15.65	1,302	1	1.00
52. Total number of hours in year	8,760		100.00	8,760		100.00	8,760		1004.8
53. Total time at work	2,444			1,641		37.776	2,854	47	32.6
54. Total time lost from work (exclusive of Sundays, holidays, and transfers, Item [51−(g+i)]	4,862			5,118		62.224	4,603	12	52.6
55. Number of days upon which any dredging was done	246			69			203.		
56. Average number of working hours per day	9 hours 56 minutes			23 hours 47 minutes			14 hours 37 mintes.		
57. Maximum number of working hours per day	15 hours 5 minutes			24 hours			15 hours 10 minutes.		
58. Average time to dredge one load	31.7 minutes			1 hour 12 minutes			53 minutes.		
59. Average time to dump one load	18.5 minutes			10 minutes			10 minutes.		
60. Average time spent going to and from dump	30.2 minutes			1 hour 34 minutes			33 minutes.		

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$18,754.86	40.14	$33,765.22	32.50	$34,978.05	39.44
62. Coal	9,343.04	19.99	22,553.07	21.72	22,793.08	25.7
63. Fuel oil						
64. Water	75.18	.17	1,054.49	1.05		
65. Supplies:						
(a) Subsistence	5,350.14	11.45	9,099.27	8.76	10,925.58	12.33
(b) Engine room	955.42	2.05	2,988.17	2.88	2,223.81	2.51
(c) Miscellaneous	1,498.77	3.21	3,046.57	2.93	3,278.68	3.69
66. Renewals of or additions to outfit	1,003.10	2.15	7,215.26	6.94	2,755.12	3.11
67. Ordinary repairs:						
(a) Hull	145.98	.312	418.35	.39		
(b) Machinery	958.03	2.05	3,712.07	3.57	40.00	.04
68. Extraordinary repairs:						
(a) Hull			7,946.88	7.65	73.00	.08
(b) Machinery	486.32	1.04	7,198.00	6.93	8,537.20	9.63
69. Alterations and additions:						
(a) Hull	70.00	.155				
(b) Machinery	12.50	.002				
70. Laundry and miscellaneous expenses, wharfage, etc.	2,438.15	5.22	1,124.76	1.06	300.88	.33
71. Office expense	126.96	.271	3,752.14	3.62	2,783.54	3.14
72. Surveys and superintendence	2,359.56	5.05				
73. Rental	[1] 3,148.41	6.74				
Total cost	46,726.42	100.00	103,874.25	100.00	88,088.94	100.00
74. Operating cost for year	$42,567.07		$80,846.81		$77,255.20.	
75. Cost per hofr of time at work. Item 74÷Item 53	$17.42		$49.26		$27.06.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.	$84,681.45		$252,000		$124,557.18.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.	12.6		13.40		0.035.	
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.	138.3		367.33		772.	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69)]÷Item 47.	0.133				0.036.	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69)]÷Item 47.	0.137		14.02		0.034	
81. Gross cost per cubic yard (cents). Total cost÷Item 47.	0.138		17.24		0.04.	
82. Total cost per yard-mile (cents)	22.1		2.46		0.014	

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Minquas.*	*Navesink.*	*New Orleans.*
MISCELLANEOUS.			
83. Fuel consumed during year (long ton or barrel)	1,916.35 tons.	3,956 long tons.	4,853.36 long tons; 5,430.76 short tons.
84. Average cost of fuel per long ton (or barrel)	$4.87	$4.86½ per long ton.	$4.69.
85. Fuel consumed per yard of dredged material in pounds—Item 83÷Item 47.	12.7	14.7	4.92.
86. Cost of water per 1,000 gallons	11.1 cents.	50 cents.	
87. Water purchased during year	675,000 gallons.	1,579,152 gallons.	
88. Total mileage of dredge during year	6,766.	8,062.	10,032.
89. Maximum dredging depth	30 feet.	55 feet.	50 feet.
90. Number of shifts worked per day	1	3.	1
91. Signal letters			
92. Wireless			
	Remarks.	*Remarks.*	*Remarks.*
	The channel has been increased to a general depth of from 18 to 20 feet over a width of 200 feet for a length of about 2 miles, the remaining distance of 2 miles has a minimum depth of about 12 feet. This dredge operated as a pipe-line hydraulic dredge in discharging material ashore, using an average length of 1,200 linear feet of 16-inch discharge pipe. The cost of pipe line and retaining banks is given in the distribution of cost. It is impracticable to render an accurate separate report of this dredge as a pipe-line dredge in Table V. No general overhauling was done this year, as it is proposed to make such repairs when ice conditions prevent dredging during the winter. The dredge was in drydock from Mar. 5 to 7, 1917, having new blades put on propellers. Present sand pump has been in use about 2½ years and is about worn out, and new liners will be installed. [1] Pipe line and banks.	**Extraordinary repairs.—Machinery:** Replacing two shafts, rebuilding of the chutes, overhauling the gates, renewing steel floor plates. Hull: Cleaning and painting of the bottom. Docked Nov. 13 at 12.30 p. m. at Boston Navy Yard and withdrawn from dock Nov. 15 at 9 a. m. to make room for battleship Delaware; redocked Nov. 17 at 3 p. m. and left dock Nov. 28. Port pump placed in service Dec. 15, 1914. Starboard pump placed in service May 10, 1915. Date of departure from district, Nov. 30; transferred to Norfolk district.	The extraordinary repairs to the dredge consisted of scraping and painting of the hull and general overhauling and repairs to machinery and boilers, etc. The dredge was docked once during the calendar year 1917, was under repairs at the naval dock from Oct. 14, 1917, to Dec. 13, 1917. The sand pump is the same as was originally installed and is 5½ years old. The pump should run 1 year without new liners.

Name.	*Raritan.*	*Sabine.*	*San Pablo.*
1. District to which dredge belongs	Second New York	Dallas, Tex	First San Francisco, Cal.
2. Where built	Sparrow Point, Md	New York, N. Y	Baltimore, Md.
3. When built	1908	1901	Date of contract, Sept. 14, 1914. Completed June, 1916.
4. Builder	Maryland Steel Co.	Townsend & Downey	Skinner Ship Building & Dry Dock Co.
5. Contract cost	$371,425	$84, 833. 40	$201,990.
6. Cost of outfit	$12,704		$3,670.84 (paid by San Francisco office.)
7. Total first cost	$397,600		$240,000 (approximately).
8. Present value	$275,000	$10,000	Dredge has not depreciated in value.
9. Time to build	9 months	10 months	December, 1914, to June, 1916, 19 months.
10. Material of hull	Steel	Wood	Steel.
11. Length over all	290 feet	145 feet	163 feet 6 inches.
12. Length between perpendiculars	276 feet	137 feet	155 feet.
13. Beam	47 feet 6 inches	35 feet	35 feet.
14. Depth amidship	28 feet	21 feet	17 feet.
15. Drafts, light:			
(*a*) Forward	12 feet 6 inches	7 feet 4 inches	8 feet 6 inches.
(*b*) Aft	14 feet 6 inches	9 feet 11 inches	15 feet.
16. Drafts, loaded:			
(*a*) Forward	23 feet 6 inches	8 feet 6 inches	14 feet.
(*b*) Aft	do	12 feet 5 inches	15 feet 6 inches.
17. Displacement:			
(*a*) Light	2,930 tons	750 tons	1,100.
(*b*) Loaded	6,900 tons	1,100 tons	1,520.
18. Number of hoppers	2	2	2.
19. Total capacity of hoppers	2,884 cubic yards	325 cubic yards	500 cubic yards.
20. Number of drags	2	2	2.
21. Type of drag	Ambrose Channel, special design	Detachable mouthpiece and scraper.	Grated suction head.
22. Number, size, and type of—			
(*a*) Dredging pumps	Two 20-inch, centrifugal	Two 10-inch centrifugal	Two 15-inch centrifugal.
(*b*) Pumping engines	Two 17 and 36 by 18 inch, compound	2 horizontal simple stroke 10$\frac{3}{32}$ by 11 inches, port 10$\frac{1}{2}$ by 11 inches.	2.
23. Revolutions per minute of pumping engines	150 to 165	275	160.
24. Total indicated horsepower of pumping engines	Builders' trials, 926	57	250.
25. Number, size, and type of propelling engines	Two 22 and 46 by 30 inch, compound	2 vertical compound stroke, 13$\frac{1}{32}$ and 27$\frac{1}{32}$ by 18 inches, port 13$\frac{1}{32}$ and 27$\frac{1}{2}$ by 18 inches	One 18 and 36 by 24 inch vertical, 2-cylinder compound.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Raritan.*		*Sabine.*	*San Pablo.*
26. Revolutions per minute of propelling engines:				
(*a*) Light	106 to 112		137	105.
(*b*) Loaded	100 to 106		125	100.
(*c*) While dredging	0 to 100		78	72.
27. Total indicated horsepower of propelling engines	Builders' trials, 1,894		382	780.
28. Average speed:				
(*a*) Light	9.5 miles		8.5 knots	8 knots.
(*b*) Loaded	7 miles		7.7	7 knots.
(*c*) While dredging	0 to 3 miles		3	1 to 2 knots.
29. Number and type of boilers	4 Scotch marine		2 Scotch marine	2, B. & W.
30. Dimensions of boilers:				
(*a*) Diameter	14 feet 6 inches		9 feet 6 inches	11 feet 7 inches wide: 10 feet 7 inches long.
(*b*) Length	12 feet		10 feet	11 feet 6 inches high.
(*c*) Heating surface (total)	10,460 square feet for 4 boilers		871.7 square feet	3,400 square feet.
(*d*) Grate surface (total)	273 square feet for 4 boilers		34	
31. Boiler pressure (gauge)	113 pounds, average		110	Designed for 200 pounds (uses 145).
32. Number of men in crew	63		17	38.
33. Number of men required to operate dredge with single crew.	25		17	20.
OPERATIONS.				
34. Location of dredging	Red Hook Channel New York Harbor.	Hudson River Channel, N. Y.	Sabine Pass Jetty Channel, and Port Arthur Canal.	San Pablo Bay.
35. Depth at mean low water before dredging	32 to 40 feet	19 to 35	26 feet	24 feet.
36. Depth at mean low water after dredging	34 to 49	35 feet	27½ feet	31 feet.
37. Character of dredged material	60 per cent sand and 40 per cent mud.	Mud	Sand, salt, and soft mud	50 per cent mud, 50 per cent fine sand.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.	3,334	4,379.2	1,203	4,152.57.
39. Total number of loads dredged during year	234	184	1,203	4.005.8.
40. Average distance from work to dump per load	14.2 miles	23.8 miles	1 mile	1.003 miles.
41. Average number of loads dredged daily (counting days worked).	1½	1.43	9.39	14.46137.
42. Maximum amount in cubic yards dredged in one day.	5,715	4,272	3,169	10,500.
43. Maximum amount in cubic yards per load	2,672	2,560.71	243.75	500.
44. Average amount in cubic yards per load	1,845	2,501.66	243.75	500.
5. Average amount in cubic yards dredged per hour pumping=Item 47+Item 50a.	213.5	396.87	477	551.03 cubic yards.

46. Maximum amount in cubic yards dredged per hour pumping.	431,784			600			449			793.8.		
47. Total amount in cubic yards dredged during year	82,162			471,170			293,232			2,005,475.		
48. Maximum amount in cubic yards dredged in one month.	....			108,827			51,919			207,900.		
49. Total amount in cubic yards dredged by this dredge in this locality.	1,412,900			471,170			6,509,124			2,746,102.		
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:												
(a) Pumping	2,022	....	44.11	1,187	10	31.859	654	35	7.5	3,639	23	41.545478
(b) Turning in cut	184	....	4.01	92	40	2.437	75	05	.9	47	32	.542617
(c) To and from dump	648	25	14.15	1,066	10	28.606	256	25	2.9	1,237	28	14.126331
(d) Dumping	154	45	3.38	59	15	1.538	....	....	....	146	1	1.666856
(e) Taking fuel and supplies	349	50	7.63	307	35	8.214	40	30	.5	249	38	2.849695
(f) To and from wharf and anchorage	53	25	1.17	50	25	1.301	289	10	3.0	242	49	2.771879
51. Time lost from work:												
(a) Bad weather	48	45	1.06	76	30	2.002	135	....	1.5	66	19	.757039
(b) Ordinary repairs	116	10	2.53	55	45	1.444	1,101	45	12.6	1,045	3	11.929794
(c) Extraordinary repairs	52	30	1.14	61	30	1.599	99	....	1.2	663	33	7.574771
(d) Alterations and additions.	....	....	....	....	....	....	....	....	....	....	....	....
(e) Out of commission	....	....	....	....	....	....	671	....	7.7	....	....	....
(f) Lying at berths nights and after working hours	200	20	4.37	79	30	2.083	4,745	....	54.2	....	....	....
(g) Transferring from one district to another	....	....	....	....	....	....	....	....	....	....	....	....
(h) Miscellaneous	9	50	.22	84	30	2.217	109	30	1.3	6	54	.078767
(i) Sundays and holidays	744	....	16.23	624	....	16.720	583	....	6.7	1,415	20	16.156773
52. Total number of hours in year	8,760	....	100.00	3,720	....	100.00	8,760	....	100.00	8,760	....	100.00
53. Total time at work	3,412	25	....	2,763	15	....	1,315	45	....	5,562	51	....
54. Total time lost from work (exclusive of Sundays, holidays, and transfers). Item [51−(g+i)]	427	35	....	332	45	....	6,861	15	....	1,781	49	....
55. Number of days upon which any dredging was done	156			129			128			277.		
56. Average number of working hours per day	21.87			21 hours 25 minutes			11			20 hours 5 minutes.		
57. Maximum number of working hours per day	24			24			11			24.		
58. Average time to dredge one load	8 hours 38 minutes			15			30 minutes			54.51 minutes.		
59. Average time to dump one load	40 minutes			19 minutes 19 seconds			....			2.187 minutes.		
60. Average time spent going to and from dump	2 hours 46 minutes			5 hours 48 minutes			15 minutes			18.535 minutes.		

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Raritan.*				*Sabine.*		*San Pablo.*	
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$41,958.22	36.92	$19,197.22	34.68	$10,330.52	30.6	$34,038.79	40.288274
62. Coal	29,427.96	25.90	16,909.50	30.55				
63. Fuel oil					10,204.16	28.8	21,450.05	25.388255
64. Water	237.67	.21	153.00	.28	3.50		478.54	.566399
65. Supplies:								
(a) Subsistence	13,171.99	11.59	5,803.00	10.48	3,269.75	9.2	8,084.82	9.569186
(b) Engine room	2,194.55	1.93	1,051.85	1.90	1,061.33	3.0	1,828.59	2.164317
(c) Miscellaneous	2,489.46	2.19	1,167.53	2.11	1,213.96	3.3	1,321.14	1.563699
66. Renewals of or additions to outfit	3,602.64	3.17	2,344.00	4.23	752.64	2.1	1,765.69	2.089868
67. Ordinary repairs:								
(a) Hull	10,000.00	8.80	1,000.00	1.81	930.62	2.7		
(b) Machinery	7,038.72	6.19	504.93	.91	2,084.69	5.9	492.89	.583384
68. Extraordinary repairs:								
(a) Hull					244.20	.7	1,993.76	2.359814
(b) Machinery							2.756.76	3.262898
69. Alterations and additions:								
(a) Hull							140.00	.165704
(b) Machinery								
70. Laundry and miscellaneous expenses, wharfage, etc.	789.87	.70	3,220.57	5.82	672.80	1.8	3,318.40	3.927654
71. Office expense	1,700.00	1.50			4,200.56	11.9	2,758.77	3.265278
72. Surveys and superintendence	1,024.13	.90					4,059.88	4.805269
73. Rental			4,000.00	7.23				
Total cost	113,635.21	100.00	55,351.60	100.00	35,468.73	100.0	84,488.08	100.000000
74. Operating cost for year	$93,872.36		$55,351.60		$28,008.66		$72,286.02	
75. Cost per hour of time at work. Item 74÷Item 53.	$27.51		$20.02		$21.29		$12.9942.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.	$11,762.80		$6,661.66		$146,076.01		$23,153.28213.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.	21.74		0.117		9.55		0.036.	
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.	126.53		170.5		223		360.51.	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost−(Items 67+68+69)]÷Item 47.	22.37		0.114		10.98		0.039444.	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost−(Items 68+69)]÷Item 47.	26.32		0.117		12.01		0.03969.	
81. Gross cost per cubic yard (cents). Total cost÷Item 47.	26.32		0.117		12.10		0.04212.	
82. Total cost per yard mile (cents)	0.0185		00049		12.10		0.04109.	

MISCELLANEOUS.

83. Fuel consumed during year (long ton or barrel)	6,936 long tons	3,912 tons	6,791.7	22520.96 barrels.
84. Average cost of fuel per long ton (or barrel)	$4.24	$4.35 per ton	$1.50+	$0.94583 per barrel.
85. Fuel consumed per yard of dredged material in pounds—Item 83÷Item 47.	36 pounds±	18.592 pounds.	7.44 pounds	3.604 pounds.
86. Cost of water per 1,000 gallons	20 cents	$15 per 1,000	$0.25	59,357,665 at 21 cents per 1,000; 234,737 at $1.50 per 1,000.
87. Water purchased during year	1,188,000 gallons	1,420,000 gallons	14,000 gallons	59,592,402.
88. Total mileage of dredge during year	10,000	8,758.4	6,000	17,193.84.
89. Maximum dredging depth	55 feet	55 feet	30 feet	42 feet.
90. Number of shifts worked per day	3	3	1	3.
91. Signal letters				
92. Wireless				
	Remarks.	*Remarks.*		*Remarks.*
	From Jan. 1 to July 10, 1917, the dredge Raritan worked in Red Hook Channel. On July 11, 1917, this dredge was transferred to the Hudson River improvement and is now operated by the first New York district.	Dredge operating in Hudson River Channel, N. Y., July 11-Dec. 31, 1917.		28 feet to 31 feet deep, and 3 feet to 500 feet in width (increased depth and width of channel due to work done during year). Repairs to hull; needed cleaning and painting. Docked once. Age of present pump, 17 months.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Savannah.*	*Sumter.*	*Winyah Bay.*
1. District to which dredge belongs	Savannah, Ga.	Charleston, S. C.	Charleston, S. C.
2. Where built	Sparrows Point, Md	Petersburg, Va.	Wilmington, Del.
3. When built	1904	1904	1898.
4. Builder	Maryland Steel Co.	Petersburg Iron Works	The Bucyrus Co.
5. Contract cost	$175,500	$144,300	$73,800.
6. Cost of outfit	$19,585.08	$7,534.14	$12,200.
7. Total first cost	$195,085.08	$191,550	$86,000.
8. Present value	$90,000	$67,500	$66,420.
9. Time to build	1 year 7 months	3 years	11 months.
10. Material of hull	Steel	Oak, yellow pine, and hackmatack	Oak frame, oak and pine planking.
11. Length over all	177 feet	200 feet	141 feet.
12. Length between perpendiculars	166 feet	185 feet	136 feet.
13. Beam	38 feet	41 feet	31 feet 6 inches.
14. Depth amidship	19 feet	22 feet	13 feet 6 inches.
15. Drafts, light:			
(*a*) Forward	10 feet	13 feet	7 feet.
(*b*) Aft	12 feet	13.9 feet	9 feet.
16. Drafts, loaded:			
(*a*) Forward	18 feet	21 feet	13 feet.
(*b*) Aft	17 feet	do	Do.
17. Displacement:			
(*a*) Light	1,461 tons	1,706.22 tons	831 tons.
(*b*) Loaded	2,950 tons	2,684 tons	1,299 tons.
18. Number of hoppers	2	2	2.
19. Total capacity of hoppers	935 cubic yards	964 cubic yards	306 cubic yards.
20. Number of drags	2	2	1.
21. Type of drag	Special design by Savannah Engineer Office.	Ordinary drag with opening in rear	Ordinary drag, with opening in rear.
22. Number, size, and type of—			
(*a*) Dredging pumps	Two 15-inch centrifugal	Two 18-inch centrifugal, Edwards make.	One 15-inch, Bucyrus Co. make.
(*b*) Pumping engines	Two 12 and 22 by 14 inch, compound	Two 14 and 26 by 18 inch stroke, fore and aft compound.	One 12 and 22 by 14 inch fore and aft, compound.
23. Revolutions per minute of pumping engines	216	200	225.
24. Total indicated horsepower of pumping engines	361.8	730	250.
25. Number, size, and type of propelling engines	Two 15 and 30 by 24 inch, compound	One fore and aft compound, 22 and 44 by 30 inch stroke.	One fore and aft compound, 17 and 32 by 24 inch stroke.
26. Revolutions per minute of propelling engines:			
(*a*) Light	120	90	115.
(*b*) Loaded	110	85	108.
(*c*) While dredging	30 to 90	30 (average)	75.
27. Total indicated horsepower of propelling engines	654.6 on trial Jan. 8, 1916, with 120 pounds of steam.	700	400.

28. Average speed:			
(a) Light	9 knots	8 knots	9 knots.
(b) Loaded	5½ knots	5 knots	8 knots.
(c) While dredging	1 to 2 knots	1 knot	1 and 2 knots.
29. Number and type of boilers	2 Scotch	2 Scotch; three 42-inch furnaces, 286 tubes, 3½-inch diameter.	1 Scotch marine.
30. Dimensions of boilers:			
(a) Diameter	13 feet	14 feet	13 feet 6 inches.
(b) Length	12 feet	12 feet	12 feet.
(c) Heating surface (total)	5,012 square feet	5,392 square feet	2,560 square feet.
(d) Grate surface (total)	125 square feet	170 square feet	72.5 square feet.
31. Boiler pressure (gauge)	120 to 125 pounds	120 pounds	115 pounds.
32. Number of men in crew	35	43	24.
33. Number of men required to operate dredge with single crew.	35	43	24.
OPERATIONS.			
34. Location of dredging	Savannah Harbor; Brunswick Harbor	Charleston Harbor, S. C. (outer bar)	Winyah Bay and Sampit River, S. C.
35. Depth at mean low water before dredging	Savannah Harbor, 22 to 24 feet; Brunswick Harbor, 20 to 22 feet.	25 feet	13 to 17½ feet.
36. Depth at mean low water after dredging	Savannah Harbor, 23 to 27 feet; Brunswick Harbor, 22 to 24 feet.	28 feet	18 feet.
37. Character of dredged material	Sand shell and mud in both places	Sand, shell, clay, and mud	Soft mud and sand.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.	1,020	425	2,329.
39. Total number of loads dredged during year	454	361	1,549.
40. Average distance from work to dump per load	2.25 miles	1.177 miles	1½ miles.
41. Average number of loads dredged daily (counting days worked).	2.82	3	6.25.
42. Maximum amount in cubic yards dredged in one day.	5,557	4,506	3,120.
43. Maximum amount in cubic yards per load	935	964	360.
44. Average amount in cubic yards per load	994.6 (by time pumping)	858.9	342.49.
45. Average amount in cubic yards dredged per hour pumping—Item 47÷Item 50a.	586.8	621.68	360.
46. Maximum amount in cubic yards dredged per hour pumping.	978	1,838	360.
47. Total amount in cubic yards dredged during year	451,557[1]	310,062	530,520.
48. Maximum amount in cubic yards dredged in 1 month.	69,584	69,783	66,600.
49. Total amount in cubic yards dredged by this dredge in this locality.	7,893,513	3,805,526	2,454,051.

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Savannah.*			*Sumter.*			*Winyah Bay.*		
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:									
(*a*) Pumping	769	29	8.784	498	45	5.69	1,473	40	16.82
(*b*) Turning in cut	73	53	.843	206	55	2.36			
(*c*) To and from dump	311	31	3.556	202	35	2.31	690	5	7.88
(*d*) Dumping	49	43	.568	36	15	.42	129		1.47
(*e*) Taking fuel and supplies	230	20	2.629	76	35	.87	48	30	.55
(*f*) To and from wharf and anchorage	295	38	3.375	261	40	2.99	208	50	2.38
51. Time lost from work:									
(*a*) Bad weather	22	48	.260	223	20	2.55	47	15	.54
(*b*) Ordinary repairs	312	18	3.565	128		1.46	227	50	2.60
(*c*) Extraordinary repairs	700	23	7.995	968	45	11.06	1,125	45	12.85
(*d*) Alterations and additions									
(*e*) Out of commission				3,336		38.08			
(*f*) Lying at berth nights and after working hours	4,279	39	48.856	1,399	50	15.99	2,852	45	32.57
(*g*) Transferring from one district to another									
(*h*) Miscellaneous	298	18	3.405	5	20	.06	510	25	5.83
(*i*) Sundays and holidays	1,416		16.164	1,416		16.16	1,445	55	16.51
52. Total number of hours in year	8,760		100.00	8,760		100.00	8,760		100.00
53. Total time at work	1,730	34	19.755	1,282	45	14.64	2,550	5	29.10
54. Total time lost from work (exclusive of Sundays, holidays, and transfers). Item [51—(g+i)]	5,613	26	64.081	6,061	15	69.20	4,764		54.39
55. Number of days upon which any dredging was done	161			111			238.		
56. Average number of working hours per day	10 hours 45 minutes			11 hours 33 minutes			10 hours 42 minutes.		
57. Maximum number of working hours per day	12			14 hours 20 minutes			14 hours 20 minutes.		
58. Average time to dredge one load	1 hour 42 minutes			1 hour 23 minutes			57 minutes.		
59. Average time to dump one load	6.6 minutes			6 minutes			5 minutes.		
60. Average time spent going to and from dump	41.1 minutes			33 minutes			8 minutes.		

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	$17,574.15	24.004	$19,279.05	32.99	$14,711.87	30.63
62. Coal	12,194.13	16.655	11,125.55	19.04	8,268.06	17.21
63. Fuel oil	29.08	.040				
64. Water	138.26	.189	170.16	.29	78.88	.16
65. Supplies:						
(a) Subsistence	7,008.10	9.572	5,057.73	8.65	4,866.42	10.13
(b) Engine room	626.37	.856	886.15	1.52	541.37	1.13
(c) Miscellaneous	1,101.46	1.504	495.26	.85	896.85	1.87
66. Renewals of or additions to outfit	1,808.19	2.470	1,167.88	2.00	1,261.28	2.63
67. Ordinary repairs:						
(a) Hull	143.86	.196	1,007.00	1.72		
(b) Machinery	715.36	.977	1,270.91	2.17	102.55	.21
68. Extraordinary expenses:						
(a) Hull	11,439.00	15.624	5,920.26	10.13	2,705.93	5.63
(b) Machinery	13,339.65	18.220	6,120.26	10.47	3,797.20	7.91
69. Alterations and additions:						
(a) Hull			28.78	.05		
(b) Machinery						
70. Laundry and miscellaneous expenses, wharfage, etc.	392.22	.536	589.61	1.01	569.63	1.19
71. Office expense	6,655.85	9.091	2,762.33	4.73	5,572.41	11.60
72. Surveys and superintendence	48.69	.066	2,562.00	4.38	4,658.20	9.70
73. Rental						
Total cost	73,214.37	100.00	58,442.93	100.00	48,030.65	100.00
74. Operating cost for year	$40,871.96		$38,771.39		$31,194.36.	
75. Cost per hour of time at work. Item 74÷Item 53	$23.386		$30,224		$12.23.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75÷Item 54.	$131,276.14		$183,195.22		$58,263.72.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.	8.963		12.5		5.9.	
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.	260.9		241.7		208.	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost−(Items 67+68+69)]÷Item 47.	10.536		14		7.8.	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost−(Items 68+69)]÷Item 47.	10.726		14.95		7.8.	
81. Gross cost per cubic yard (cents). Total cost÷Item 47.	16.214		18.84		9.	
82. Total cost per yard mile (cents)	7.206		16		6.	

TABLE 4.—*Operations of seagoing dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Savannah.*	*Sumter.*	*Winyah Bay.*
MISCELLANEOUS.			
83. Fuel consumed during year (long tons or barrel)	2,440.06 tons	1,813.4 long tons	1,198 long tons.
84. Average cost of fuel per long ton (or barrel)	$4.997 per ton	$6.07 long ton	$6.90 per long ton.
85. Fuel consumed per yard of dredged material, in pounds—Item 83÷Item 47.	12.14	13.1 pounds	5 pounds.
86. Cost of water per 1,000 gallons	$1.023	15 to 25 cents per 1,000 gallons	25 cents per 1,000 gallons.
87. Water purchased during year	135,100 gallons	963,346 gallons	315,520 gallons.
88. Total mileage of dredge during year	5,523	3,074	5,172.
89. Maximum dredging depth	39 feet	48 feet	40 feet.
90. Number of shifts worked per day	1	3	1.
91. Signal letters		GWMC	GWMC.
92. Wireless			
	Remarks.	*Remarks.*	*Remarks.*
	Dredge under repairs at Jacksonville, Fla., from Jan. 1 to Mar. 14, 1917. Hull: Repairing deck, bins, and cleaning and painting hull. Machinery: Overhauling all machinery. One docking. Age of present sand pumps 7½ years. Pumps should run 6 months without new liners. Work during calendar year has been mainly the maintenance of channel.	The dredge was operated on the outer bar at Charleston, S. C., from Jan. 4 to Mar. 19, and from May 1 to June 12, 1917. As to results obtained during the year, surveys show a good channel across the outer bar, with a least width of 900 feet and a controlling depth of 28 feet at mean low water. Extraordinary repairs to the dredge consisted of overhauling and repairing pipe line, boilers, engines, pumps, hoisting engines, electric-light plant, deck, bins and hull. Dredge docked once during the year at the works of Merrill-Stevens Co., Jacksonville, Fla., Mar. 20 to Apr. 30, 1917. Age of pump, 9 years 4 months. The dredge was laid up from June 12 to Nov. 26, 1917, on account of the low state of funds and uncertainty as to date on which the appropriation would become available.	Maintenance of channel along western shore of Winyah Bay, and in mouth of Sampit River; restoring the depth of 18 feet, with a width of 400 feet. Extraordinary repairs to dredge consisted of overhauling and repairing boiler, engine, pumps, hoisting engine, deck, hull and bins. Dredge docked once during the year at the works of Valk & Murdoch Co., Charleston, S. C., June 23, to Aug. 22, 1917. Age of pump, about 6¼ years.

[1] Savannah Harbor 336,749 cubic yards; Brunswick Harbor 114,808 cubic yards.

TABLE 5.

HYDRAULIC PIPE-LINE DREDGES.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917.*

Name	*Apo.*	*Augusta.*	*Bacon, Henry.*	*Barnard.*
1. District	Rock Island, Ill.	Savannah, Ga.	Wilmington, N. C.	Jacksonville, Fla.
2. When built	1911–12	1911	1907	1904.
3. Where built	Keokuk, Iowa	Jacksonville, Fla.	Westlake, La.	Camden, N. J.
4. Builder	United States	Merrill-Stevens Co.	F. H. Swails	New York Shipbuilding Co.
5. Time to build	About 1 year	6 months	Unknown	13 months.
6. Matreial of hull	Wood, steel, and concrete	Steel	Wood	Steel.
7. Contract cost of dredge	(No contract) $28,702.97	$17,875	$124,000, including plant	$240,000.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) Included above; (*b*) $7,340.88	(*a*) $2,572.90; (*b*) included in (*a*).	Included in contract cost	(*a*) Not known; (*b*) $26,825.68.
9. Length	130 feet	74 feet	150 feet 6 inches	198 feet 8 inches (223 feet over all).
10. Beam	28 feet	28 feet	39 feet	38 feet.
11. Depth	5 feet	4 feet 6 inches	Bow, 15 feet; stern, 12 feet 6 inches.	14 feet.
12. Draft:				
(*a*) Forward	39 inches	2 feet 6 inches	9 feet 9 inches	8 feet.
(*b*) Aft	32 inches	2 feet 6 inches	7 feet 4 inches	10 feet.
13. Displacement (long tons)	263	140.3 tons	1,410 tons	1,291.
14. Number of crew	19 men	12	39	54.
15. Number, size, and type of propelling engines.	None	None		Two 12-inch, 18-inch, and 30 by 18 inch triple expansion.
16. Number, size, and type of pumping engines.	One 13 and 25 by 16 inch cross compound, condensing.	One 2-cylinder, 8 by 8 inch vertical, opposite crank, direct connects to 10-inch dredge pump.	One 14 by 22½ by 36 inch, 18-inch stroke.	One 14-inch, 22½-inch, and 40 by 20 inch, triple expansion.
17. Cutter engines:				
(*a*) Diameter of cylinders	None	5 inches	12 inches	12 inches.
(*b*) Stroke		8 inches	14 inches	14 inches.
18. Hauling engines:				
(*a*) Diameter of cylinders	8½ inches	7 inches	10 inches	8½ inches.
(*b*) Stroke	10 inches	10 inches	12 inches	12 inches.
19. Boilers:				
(*a*) Number and type	3, Mississippi River type	1, horizontal, return tubular, under fired.	2, Heine water tube	2, Scotch marine, double-ended.
(*b*) Length	20 feet 2½ inches	14 6 feet	19 feet 4 inches (drum)	18 feet.
(*c*) Diameter	40½ inches	5 feet 4 inches	36 inches (drum)	11 feet.
(*d*) Heating surface (total)	1,166 square feet	1,110 square feet	4,888 square feet	4,080 square feet.
(*e*) Grate surface (total)	48.75 square feet	30 square feet	106.5 square feet	172 square feet.
20. Discharge pipe in use (average number of feet).	1,050	450 feet	1,500 feet	780.
21. Diameter of discharge pipe	18 inches	10 inches	20 inches	22 inches.
22. Pontoons:				
(*a*) Number and material of those in use (average).	21 wood and concrete	14 wooden pontoons	65 wood	25 steel and 41 wood.
(*b*) Dimensions	50 by 14 feet by 3 feet 4 inches	16 by 10 feet by 16 inches	20 feet 5 inches by 5 feet by 4 feet 5 inches deep.	Wood, 20 by 8 by 4 feet. Steel, 23 feet by 9 feet 5 inches by 3 feet 9 inches.

23. Revolutions per minute of propelling engines.	None	None		Not used.			
24. Revolutions per minute of pumping engines.	234	375	165–170	160.			
25. Type of agitator or cutter head	None	Revolving tooth and blade	Spiral	Revolving spiral, with inserted teeth.			
26. Diameter of cutter		3 feet	6 feet	6 feet 11 inches.			
27. Diameter of cutter shaft		3¼ inches	8 inches	7½ inches.			
28. Type of suction head	Plain square	Oblong	Ordinary pipe	Round, with hood.			
29. Revolutions per minute of cutter head.	None	14	15	11.			
30. Average boiler pressure (gauge)	137½ pounds	90 pounds	165 to 175 pounds	147 pounds.			
31. Kind of coal used	Bituminous lump and mine run	Bituminous	Bituminous	Alpha, Pocahontas, Crow Mountain (bituminous).			
32. Average gauge pressure in discharge pipe.	21.5 pounds	16 pounds	20 to 25 pounds	20 pounds per square inch.			
33. Average vacuum in suction pipe	8.8 inches Hg	17 inches	12 to 14 inches	9 inches.			
ATTENDANT PLANT.							
Towboat.							
34. Name of tug attached to dredge	None regularly	None	Cynthia				
35. Number of crew			8				
36. Displacement			135				
37. Draft:							
(a) Forward			5 feet 6 inches				
(b) Aft			8 feet 4 inches				
Launches.							
38. Name	None	Seneca	Sanders	Violetta.	Edra (hired).		
39. Length		39 feet 8 inches	44 feet	34 feet	36 feet.		
40. Beam		8 feet 5 inches	9 feet	11 feet 4 inches	9 feet.		
41. Depth		3 feet 9 inches	2 feet 9 inches	4 feet 4 inches	4 feet.		
42. Draft		3 feet	3 feet 6 inches	4 feet, fin keel	3 feet.		
43. Displacement		8 tons	3 tons	8 tons.			
Barges.							
44. Identifying numbers of barges in use	No. 498 and No. 499	1 coal lighter	B–11, No. 5. and No. 6	U. S. S–1.	U. S. B–2.	U. S. B–3.	U. S. B–4.
45. Usage	Coal	Coal and water	Fuel, water, handling anchors, etc.	Water	Fuel		
46. Displacement, light (each)	50 long tons	10 tons	B–11, 65; No. 5, 65; No. 6, 65 tons.	50.5[1]	50.5[1]		
47. Capacity of barges (each)	132 long tons	25 tons	B–11, 90; No. 5, 90; No. 6, 90 tons.	80[1]	80[1]		

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Apo.*	*Augusta.*	*Bacon, Henry.*	*Barnard.*
WORK PERFORMED.				
48. Location of dredging	Miles 518, 535, 574, 593, and 601	(*a*) Savannah Harbor; (*b*) channel from Savannah to Beaufort, S. C.	(*a*) Upper Midnight and Upper and Lower Old Brunswick Cove Channels, Cape Fear River, at and below Wilmington; (*b*) Pridgens Landing, Cape Fear River, above Wilmington, N. C.	Hillsboro Bay, Fla.
49. Average depth before dredging	2.92 to 12.5 feet	(*a*) See footnote; (*b*) 5 to 7 feet	(*a*) 21 to 28 feet; (*b*) 6 feet	12 to 20 feet, average about 12.7 feet.
50. Average depth after dredging	7 to 15.06 feet	(*a*) See footnote; (*b*) 7 to 8 feet	(*a*) 26 to 30 feet; (*b*) 7 feet	25.1 feet.
51. Character of material dredged	Sand, gravel, and mud	Sand and mud	(*a*) 75 per cent mud; 20 per cent sand; 5 per cent roots and débris; (*b*) 80 per cent rock; 20 per cent sand.	90 per cent rock, 10 per cent sand and mud.
52. Rate of advance per hour (in feet straight ahead).	17.7	14.1	7.76	0.2 to 7.3.
53. Amount dredged during the year	248,989 cubic yards	102,045 cubic yards [1]	(*a*) 519,524; (*b*) 7,353 cubic yards.	156,397 cubic yards.
54. Total amount dredged by this dredge at this locality.	do	888,910 cubic yards	(*a*) 4,288,032; (*b*) 7,353 cubic yards	542,849 cubic yards.
55. Average amount dredged:				
(*a*) Per hour (pumping)	369.7 cubic yards	123.9 cubic yards	(*a*) 364.3; (*b*) 175 cubic yards	48.4 cubic yards.
(*b*) Per day	3,036.4 cubic yards	1,360.6 cubic yards	(*a*) 5,971.5; (*b*) 1,225.5 cubic yards	814.5 cubic yards.
56. Maximum amount dredged in one month.	86,745 cubic yards	35,167 cubic yards	202,296	33,248 cubic yards.
57. Total number of days upon which any dredging was done.	82	75	93	192.
58. Average number of working hours per working day.	10 hours 7 minutes	13 hours 28 minutes	20 hours 57 minutes	18 hours 40 minutes.
59. Maximum number of working hours per working day.	16	16	24	23.

	Apo.			*Augusta.*			*Bacon, Henry.*			*Barnard.*		
DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(*a*) Pumping	673	26	7.69	823	10	9.937	1,396	5	15.94	[2] 3,228		36.85
(*b*) Handling pipe line	245	31	2.80	146	5	1.668	88	40	1.01	124	35	1.43
(*c*) Handling swinging wires (cleaning suction).	11	31	.13	29	45	.340	410	30	4.70	195	55	2.23

(*d*) Going to and from wharf or anchorage.	103	30	1.18	....	....	....	....	....	....	....	....	....
(*e*) Placing dredge	127	36	1.46	9	5	.104	45	55	.52	33	55	.40
(*f*) Waiting for vessels to pass	1	11	.01	1	35	.018	21	10	.24	....	....	....
61. Time lost from work:												
(*a*) Changing location of plant	198	18	2.26	257	15	2.937	168	....	1.92	45	20	.52
(*b*) Bad weather	14	11	.16	50	....	.571	....	....	....	....	....	....
(*c*) Washing boilers and ordinary repairs.	101	8	1.16	298	20	3.405	176	....	2.01	1,215	35	13.87
(*d*) Extraordinary repairs	122	12	1.40	70	....	.799	....	....	....	1,932	35	22.06
(*e*) Other causes	6,545	26	74.72	[3] 6,450	45	73.638	5,997	40	68.46	568	5	6.38
(*f*) Sundays and holidays	616	....	7.03	624	....	7.123	456	....	5.20	141.6	....	16.16
62. Total hours in year	8,760	....	100.00	8,760	....	100.000	8,760	....	100.00	8,760	....	100.00
63. Total time at work	1,162	45	13.27	1,009	40	11.527	1,962	20	22.40	3,582	25	....
64. Total time lost from work	7,597	15	86.73	7,750	20	88.473	6,797	40	77.60	5,177	35	....
COST OF WORK.												
Dredge.												
65. Pay rolls		$6,007.28			$5,529.34			$7,415.23			$36,392.06	
66. Fuel for boilers		4,018.73			1,151.28			11,510.24			[4] 32,701.39	
67. Coal for galley		54.70			10.00			18.81			182.12	
68. Water		....			....			....			1,741.06	
69. Supplies, subsistence		1,807.05			1,781.13			2,391.44			12,194.08	
70. Supplies, engine room		472.17			460.25			428.09			2,919.62	
71. Other supplies		911.96			332.41			157.12			1,700.60	
72. Renewals or additions to outfit		558.23			314.89			545.76			16,674.53	
73. Ordinary repairs:												
(*a*) Hull		85.84			23.50			140.72			8,045.86	
(*b*) Machinery (exclusive of main dredging pump)		147.42			26.60			401.13			6,544.06	
74. Laundry, ice, miscellaneous expenses		265.97			41.97			89.93			1,291.62	
75. Total			$14,329.35			$9,671.37			$23,098.47			$120,387.00
Main dredging pump.												
76. Diameter of runner	50 inches			30 inches			84 inches			84 inches.		
77. Volute (lined or unlined)	Unlined			Unlined			Unlined			Unlined.		

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Apo.*				*Augusta.*				*Bacon, Henry.*				*Barnard.*			
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(a) Volute	......	......	$85.51		......	......	......		......	......	......		......	......	......	
(b) Runner	......	......	140.73		......	......	......		......	......	......		......	......	......	
(c) Volute liners	......	......	......		......	......	......		......	......	......		......	......	......	
(d) Runner liners	......	......	......		......	......	......		......	......	......		......	......	......	
(e) Head and back liners	......	......	304.04		......	......	......		......	......	......		......	......	......	
79. Miscellaneous repairs	......	......	......		......	......	$80.00		......	......	......		......	......	$33.28	
80. Total	......	......	......	$530.28	......	......	......	$80.00	......	......	......		......	......	......	$33.28
Pipe line.																
81. Renewals:																
(a) Rubber sleeves	12	......	514.80						......	......	......		10	......	607.56	
(b) Pipe	[1] 485	......	6,327.95		......	......	387.50		......	......	......		......	......	18,121.88	
(c) Pontoons	......	......	......		......	......	70.93		......	......	......		......	......	10.10	
(d) Outfit	......	......	......		......	......	......		......	......	......		......	......	155.70	
82. Repairs	......	......	94.61		......	......	......		......	......	$63.75		......	......	617.60	
83. Miscellaneous	......	......	......		......	......	......		......	......	20.82		......	......	426.18	
84. Total	......	......	......	$6,937.36	......	......	......	$458.43	......	......	......	$84.57	......	......	......	$9,937.02
Towboats and launches.																
85. Pay rolls			$407.64				......				$1,206.59				$1,507.67	
86. Fuel for boilers			429.62				17.45				1,086.40				[4] 1,307.20	
87. Coal for galley			......				......				......				......	
88. Water			497.79				......				......				......	
89. Supplies, subsistence			42.00				......				16.00				(5)	
90. Supplies, engine room			106.40				......				65.49				......	
91. Launch supplies			......				......				......				33.78	
92. Other supplies			......				......				.25				7.22	
93. Renewals of or additions to outfit			......				5.82				5.89				6.82	
94. Ordinary repairs			28.03				.60				16.00				390.30	
95. Laundry, ice, miscellaneous expenses, etc.			18.30				......				200.00				......	
96. Total				$1,529.78				$23.87				$2,596.62				$3,253.49

Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges	....		....		35.17		....	
98. Miscellaneous expenses	....		....		6.67		1,671.67	
99. Total field cost		$23,326.77		$10,233.67		$25,821.50		$145,282.46
100. Total field cost per cubic yard (cents).	$9.37		10.028		$4.5		92.91.	
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	901.77		1,083.62		1,350.00		9,310.00	
102. Extraordinary repairs to dredge:								
(*a*) Hull	....		37.31		....		20,024.12	
(*b*) Machinery (exclusive of main dredging pump).	....		88.27		....		517.98	
103. Extraordinary repairs to towboats and launches.	....		....		....		....	
104. Extraordinary repairs to barges	....	901.77	476.94	1,686.14	....	1,350.00	19.55	29,871.65
105. Total		$24,228.54		$11,919.81		$27,171.50		$175,154.11
106. Gross cost per cubic yard (cents)	$9.73		11.681		$5.1		111.98.	
MISCELLANEOUS.								
107. Fuel consumed by dredge, tons or barrels.	1,410.80 short tons		274 long tons		1,526.61 short tons		5,338.4 tons.	
108. Fuel consumed by auxiliary plant, tons or barrels.			205 gallons kerosene		4,705 gallons		5,640 gallons gasoline at 23 cents.	
109. Total cost of all fuel	$5,506.35, $3.903 per ton		$1,168.73		$12,596.64		$34,190.71.	
110. Total water purchased (gallons)			None				1,741,060.	
111. Cost of water per 1,000 gallons							$1 per 1,000 gallons.	
112. Linear feet of pipe line built during year and cost per linear foot.	None		None				(a)	
113. Average increase of depth of channel cut over.	5 feet		2.32 feet		5 to 7 feet		12.3 feet.	
114. Maximum dredging depth	21 feet		15 feet		45 feet		32 feet.	
115. Number of shifts worked per day	2		1		3 (double crew)		3.	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Apo.*	*Augusta.*	*Bacon, Henry.*	*Barnard.*
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	[1] Linear feet.	[1] 44,245 cubic yards, channel Savannah, Ga., to Beaufort, S. C. 57,800 cubic yards, Savannah Harbor, in filling behind training walls and building up some closing dams. [2] Dredge laid up from June 8 to Dec. 31, 1917.	Crew of launch subsisted on dredge. Fuel was purchased by short tons. The separate labor cost of work done by crew is $450, and is included in Item No. 65. Fuel for launch was purchased by gallons.	[1] Tons. [2] The dredge was under repairs at Jacksonville, Fla., from Nov. 21, 1916, to Mar. 28, 1917. Work was resumed Apr. 1, 1917. [3] Cost of coal is f. o. b. United States barge at Tampa, Fla., 2,000 pounds to ton: Imperial, 1,986 tons, at $3.70. Pocahontas, 255 tons, at $9. Crow Mountain, 620 tons, at $4.85. Alpha, 410 tons, at $8.35. Alpha, 328 tons, at $7,415. Alpha, 1,536.4 tons, at $8.12. Alpha, 163 tons, at $8.10. Pocahontas, 40 tons, at $10. [4] Gasoline. [5] Subsistence furnished on dredge. [6] 1,000 feet ponton pipe at $8.51, 600 feet shore pipe, $2.48.

Name	*Beta.*	*Blackwater.*	*Cataract.*	*Celilo.*
1. District	St. Louis, Mo., Mississippi River Commission.	Montgomery, Ala.	Philadelphia, Pa.	First, Portland, Oreg.
2. When built	1896	Completed June 20, 1911	1905	1916.
3. Where built	Pittsburgh, Pa.	Pine Barren, Fla.	Baltimore, Md.	Big Eddy, Oreg.
4. Builder	Lindon W. Bates	U. S. Engineer Department	Ellicott Machine Corporation	Constructed by hired labor.
5. Time to build	11 months	11½ months to build and install machinery.		3 months.
6. Material of hull	Steel	Wood	Wood	Wood.
7. Contract cost of dredge	$172,775	$63,289.23	$80,600	Hired labor, $3,289.16.
8. (*a*) Cost of outfit; (*b*) cost of pipe line		(*a*) $5,881.28	(*a*) $5,450.17; (*b*) $8,761.11	Total, $1,710.84.
9. Length	214 feet	110 feet	140 feet 6 inches	76 feet.
10. Beam	58 feet	32 feet	40 feet 4 inches	22 feet.
11. Depth	6 feet 11 inches	10 feet 7 inches	10 feet 7 inches	4 feet 4 inches.
12. Draft:				
(*a*) Forward	5 feet 2 inches	5½ feet	6 feet 2 inches	18 inches.
(*b*) Aft	4 feet 7 inches	5 feet	6 feet 6 inches	21 inches.
13. Displacement (long tons)	1,300	452	886	61.
14. Number of crew	56	24	24	6.
15. Number, size, and type of propelling engines.	None	None, nonpropelling	None	None.
16. Number, size, and type of pumping engines.	Two 20½, 33, and 38 inch by 24-inch stroke; vertical, triple expansion, condensing.	One 12 and 24 by 14 inch stroke, inverted compound, condensing.	One 12, 22, and 33 by 20 inches; triple expansion.	One Morris double engine, 7 by 7.
17. Cutter engines:				
(*a*) Diameter of cylinders	None	10½ inches	11 inches	None.
(*b*) Stroke		10 inches	14 inches	
18. Hauling engines:				
(*a*) Diameter of cylinders	7 inches	7 inches	10 inches	Do.
(*b*) Stroke	do.	10 inches	14 inches	
19. Boilers:				
(*a*) Number and type	4 Heine water-tube	2 Scotch marine	2 Scotch marine	1 locomotive type.
(*b*) Length	19 feet 6 inches	14 feet 5 inches	12 feet	14 feet 10 inches.
(*c*) Diameter	10 feet 7 inches width	8 feet	11 feet 4 inches	5 feet 5½ inches.
(*d*) Heating surface (total)	10,612 square feet	2,200 square feet	3,053 square feet	820 square feet.
(*e*) Grate surface (total)	216 square feet	48 square feet	98 square feet	22 square feet.
20. Discharge pipe in use (average number of feet).		800 feet	1,800 feet	47 feet.
21. Diameter of discharge pipe	33 inches	15 inches	20 inches	8 inches
22. Pontoons:				
(*a*) Number and material of those in use (average).		10; wood	12 to 18; wood	None.
(*b*) Dimensions		5 feet by 16 feet by 2 feet 6 inches	20 feet long; 18 feet wide; 2 feet 6 inches deep.	
23. Revolutions per minute of propelling engines.		None	None	Do.
24. Revolutions per minute of pumping engines.		190	190	365.
25. Type of agitator or cutter head	Water-jet agitator	Cutter head, spiral type	Spiral	Water jet.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Beta.*	*Blackwater.*		*Cataract.*		*Celilo.*
26. Diameter of cutter		5 feet 8½ inches diameter over blades.		5 feet 5 inches		
27. Diameter of cutter shaft		6¼ inches		7½ inches		
28. Type of suction head	Upstream, with water jet	Suction from within cutter head		Plain, round		Drag head.
29. Revolutions per minute of cutter head		15		6		
30. Average boiler pressure (gauge)		137 pounds		185 pounds		110 pounds.
31. Kind of coal used		Bituminous		Semibituminous		Semibituminous.
32. Average gauge pressure in discharge pipe.		16 pounds		20 pounds		12 pounds.
33. Average vacuum in suction pipe		6 to 7 inches		15 inches		4.
ATTENDANT PLANT.						
Towboat.						
34. Name of tug attached to dredge		None		Camden		None.
35. Number of crew				8		
36. Displacement				175 tons		
37. Draft:						
(*a*) Forward				7 feet		
(*b*) Aft				8 feet		
Launches.						
38. Name		*Shearwater.*	*Coot.*	*New Castle.*	*Trenton.*	None.
39. Length		40 feet	21 feet	24 feet 6 inches	28 feet	
40. Beam		8 feet	4 feet 7 inches	7 feet	8 feet	
41. Depth		4 feet 6 inches	2 feet	36 inches	44 inches	
42. Draft		3 feet 6 inches	19 inches	do	36 inches	
43. Displacement		4 tons	1.5 tons	1½ tons	4½ tons	
Barges.						
44. Identifying numbers of barges in use		No. 25	No. 41	3, 5, and 6		Do.
45. Usage		Quarterboat	Coal	Coal, derrick, and water		
46. Displacement, light (each)		120 tons	98 tons	330, 50, and 60 tons		
47. Capacity of barges (each)		150 tons	100 tons	No. 3, 140 tons; No. 6, 35 tons		

WORK PERFORMED.				(1)	(2)	(3)						
48. Location of dredging							Delaware River below Philadelphia, Pa.			Dalles Celilo Canal.		
49. Average depth before dredging				2 feet	1 to 12 feet	2 feet	15 to 32 feet			6 feet.		
50. Average depth after dredging				7 feet	18 to 22 feet.	8 feet	30 to 32 feet			10 feet.		
51. Character of material dredged				Sand	Sand and clay.	Sand	Mud, clay, sand, and gravel			Sand and silt.		
52. Rate of advance per hour (in feet straight ahead).				13.9	5.38	10.03	15 to 60			5 feet 4 inches.		
53. Amount dredged during the year				24,857 cubic yds.	188,371 cubic yds.	40,018 cubic yds.	1,223,700 cubic yards			23,766 cubic yards.		
54. Total amount dredged by this dredge at this locality.				do	do	do	7,567,502 cubic yards			Do.		
55. Average amount dredged:												
(a) Per hour (pumping)				362	261.5	206	743 cubic yards			27.42 cubic yards.		
(b) Per day				2,259	3,145	2,154	7,895 cubic yards			225.50 cubic yards.		
56. Maximum amount dredged in 1 month				24,857	88,465	38,941	245,598 cubic yards			6,051 cubic yards.		
57. Total number of days upon which any dredging was done.				11	96	19	155			123.		
58. Average number of working hours per working day.				6.26	12.01	9.9	10 hours 32 minutes			6¼.		
59. Maximum number of working hours per working day.				8.75	18.75	14	12			8.		
DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping				1,407		16.06	1,081	15	12.34	808		9.22
(b) Handling pipe line				523	15	5.97	538	45	6.15	17		.16
(c) Handling swinging wires (cleaning suction).				157	15	1.80	9	55	.11			
(d) Going to and from wharf or anchorage.												
(e) Placing dredge				98		1.12	3	40	.04	21		.25
(f) Waiting for vessels to pass										49	30	.56
61. Time lost from work:												
(a) Changing location of plant				202		2.31	75	30	.86	49	30	.56
(b) Bad weather				27	30	.32	117		1.35	23		.26
(c) Washing boilers and ordinary repairs.				477		5.45	147		1.68	56	30	.64
(d) Extraordinary repairs				1,980		22.26	1,869	5	21.34	10	30	.11
(e) Other causes				2,526		28.82	3,357	50	38.32	290		3.31
(f) Sundays and holidays				1,392		15.89	1,560		17.81			84.93
62. Total hours in year	8,760		100.00	8,760		100.00	8,760		100.00	8,760		100.00
63. Total time at work				2,185	30	24.95	1,633	35	18.64	895	30	10.22
64. Total time lost from work				6,574	30	75.05	7,126	25	81.36	7,864	30	89.78

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Beta.*				*Blackwater.*				*Cataract.*				*Celilo.*			
COST OF WORK.																
Dredge.																
65. Pay rolls			....				$16,527.41				$20,092.55				$2,601.68	
66. Fuel for boilers			....				5,344.40				5,093.91				1,712.75	
67. Coal for galley			....				....				65.26				....	
68. Water			....				26.40				85.06				....	
69. Supplies, subsistence			....				4,363.25				4,917.62				....	
70. Supplies, engine room			....				168.51				790.18				65.58	
71. Other supplies			....				1,936.06				616.92				20.00	
72. Renewals or additions to outfit			....				791.55				2,190.16				....	
73. Ordinary repairs:																
(*a*) Hull			$400.06				....				211.39				....	
(*b*) Machinery (exclusive of main dredging pump).			7.23				187.80				144.75				288.15	
74. Laundry, ice, miscellaneous expenses.			....				436.43				432.71				....	
75. Total				$407.29				$29,781.81				$34,640.51				$4,688.16
Main dredging pump.																
76. Diameter of runner	84 inches				60 inches				6 feet				30 inches.			
77. Volute (lined or unlined)	Unlined				Unlined				Lined				Lined.			
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(*a*) Volute	......	......	......		......	......	......		......	......	......		......	......	......	
(*b*) Runner	......	......	......		......	......	......		......	......	......		......	......	......	
(*c*) Volute liners	......	......	......		......	......	......		......	......	$48.81		......	......	......	
(*d*) Runner liners	......	......	......		3	624	......		......	......	......		......	......	......	
(*e*) Head and back liners	......	......	......		3	624	$524.03		......	......	......		......	......	......	
79. Miscellaneous repairs	......	......	......		......	......	523.10		......	......	44.84		......	......	$306.00	
80. Total								$1,047.13				$93.65				$306.00

Pipe line.																
81. Renewals:																
(a) Rubber sleeves																
(b) Pipe					20	1,160	$510.40		12	(1)	819.00					
(c) Pontoons					4 500	1,230	1,370.00									
(d) Outfit																
82. Repairs						1,407	67.67								88.29	
83. Miscellaneous							161.40				1,934.41				39.00	
84. Total								2,109.47				2,753.41				127.29
Towboats and launches.																
85. Pay rolls							$923.57				$1,990.00					
86. Fuel for boilers							488.77				669.93					
87. Coal for galley											41.10					
88. Water																
89. Supplies, subsistence							197.05				516.88					
90. Supplies, engine room							60.51				153.85				$115.00	
91. Launch supplies							75.88				415.78					
92. Other supplies							5.32				24.74					
93. Renewals of or additions to outfit											227.38					
94. Ordinary repairs											63.43					
95. Laundry, ice, miscellaneous expenses, etc.											286.61					
96. Total								$1,751.10				$4,389.70				$115.00
Barges (amounts chargeable to dredge).																
97. Ordinary repairs to barges																
98. Miscellaneous expenses																
99. Total field cost				407.29				34,689.51				41,876.77				$5,235.45
100. Total field cost per cubic yard (cents).					13.7				3.4				22.03.			
Extra expenses.																
101. Office expenses, superintendence, surveys, etc.			$6.66				247.89				3,138.21				400.00	
102. Extraordinary repairs to dredge:																
(a) Hull							4,973.46				896.92					
(b) Machinery (exclusive of main dredging pump).							2,231.24				1,129.34					
103. Extraordinary repairs to towboats and launches.							717.82				490.02					
104. Extraordinary repairs to barges							1,970.12				1,272.92					
				6.66				10,140.53				6,927.41				400.00
105. Total				$413.95				$44,830.04				$48,804.18				$5,635.45
Gross cost per cubic yard (cents)					17.7				3.99				2.37.			

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Beta.*	*Blackwater.*	*Cataract.*	*Celilo.*
MISCELLANEOUS.				
107. Fuel consumed by dredge, tons or barrels.		1,342.11 tons	1,427 tons	263¼ short tons.
108. Fuel consumed by auxiliary plant, tons or barrels.		2,263 gallons of gasoline	45 tons (derrick scow)	
109. Total cost of all fuel		$5,833.17	$5,870.20	$6.50 short ton.
110. Total water purchased (gallons)		26,400 gallons	189,000 gallons	None.
111. Cost of water per 1,000 gallons		$1	45 cents	
112. Linear feet of pipe line built during year and cost per linear foot.		500 feet, at $3.75 per foot	730 feet, at $2.53 per linear foot	None.
113. Average increase of depth of channel cut over.		7 feet		4 feet.
114. Maximum dredging depth		30 feet	35 feet	15 feet.
115. Number of shifts worked per day		3	1	1.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	No dredging done by this dredge during the year.	From Jan. 1 to Mar. 21 this plant was tied up in Wetappo Creek, Fla., owing to lack of funds. On Mar. 22 she was towed to Pensacola, Fla., arriving there on Mar. 29, and began work dredging a 7-foot channel at the new 12-inch battery, Fort Pickens, Fla., which work was completed Apr. 15. Dredge was then taken to Pensacola for necessary repairs before beginning work for the Bruce Dry Dock Co., which work was commenced on May 3 and completed on Aug. 31, 1917. On Sept. 1 the Blackwater and attendant plant were taken to Bagdad, Fla., for repairs, which were completed in November, and on Nov. 28 work was commenced for Warren Fish Co. and completed on Dec. 28, 1917. No separate labor cost kept.	Work done by Cataract in 1917. The Cataract was engaged from Jan. 1 to 29, 1917, in filling new piers and bulkhead at Fort Mifflin, Philadelphia, Pa. On Jan. 30 the dredge was made ready for annual repairs and towed to shipyard at Camden, N. J., where it underwent annual overhaul until Mar. 8, 1917. From that date until May 10 the dredge was at Fort Mifflin, Pa., awaiting the completion of new trestle line. On May 10 she was towed to Artificial Island and crew at once laid pipe line and assembled plant. Actual pumping was begun May 29 and continued until Dec. 7, when dredging was stopped, due to ice conditions in the river. The dredge was then towed to Fort Mifflin, Pa., and the crew was engaged throughout the balance	Pump outfit and pipe line transferred from old dredge Wallowa. Dredge is used on Dalles Celilo Canal for maintenance and care of canal and locks.

		Fuel purchased by long ton. [1] Pensacola Harbor, Fla., dredging channel at new 12-inch battery, Fort Pickens, Fla. [2] Pensacola Harbor, Fla., dredging at site for shipbuilding plant, Bruce Dry Dock Co. [3] Pensacola Harbor, Fla., dredging 2 fishing smacks from beach for Warren Fish Co. [4] Feet.	of the year in making annual repairs. While at Artificial Island the dredge was engaged in excavating a basin and in rehandling material deposited in this basin by the dredges Delaware and Manhattan. After completing the excavation of the basin the dredge operated during one ebb tide each day. [1] Not used.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*De Witt Clinton.*			*Creighton.*
1. District	First New York			Savannah, Ga.
2. When built	1913			1914-1915.
3. Where built	Baltimore, Md			Charleston, S. C.
4. Builder	Ellicott Machine Corporation			United States Navy Yard.
5. Time to build	6 months			13 months.
6. Material of hull	Wood			Steel.
7. Contract cost of dredge	$62,825			$39,389.86.
8. (*a*) Cost of outfit; (*b*) Cost of pipe line	(*a*) $8,400; (*b*) $10,775			(*a*) $2,368.05; (*b*) $2,567.50.
9. Length	95 feet			80 feet.
10. Beam	27 feet 6 inches			30 feet.
11. Depth	8 feet 6 inches			6 feet.
12. Draft:				
(*a*) Forward	6 feet 6 inches			3 feet 6 inches.
(*b*) Aft	6 feet			3 feet 3 inches.
13. Displacement (long tons)	383 tons			221.
14. Number of crew	42 men	55 men	53 men	26.
15. Number, size, and type of propelling engines.	None			None.
16. Number, size, and type of pumping engines.	One 12 and 24 by 14 inches fore and aft compound.			One 12 and 24 by 14 inch, compound.
17. Cutter engines:				
(*a*) Diameter of cylinders	8½ inches			7½ inches.
(*b*) Stroke	12 inches			10 inches.
18. Hauling engines:				
(*a*) Diameter of cylinders	7 inches			7½ inches.
(*b*) Stroke	10 inches			10 inches.
19. Boilers:				
(*a*) Number and type	1 Heine water tube. 1 Ames vertical fire tube.			1 Scotch with two 36-inch furnaces.
(*b*) Length	16 feet 9 feet			13 feet.
(*c*) Diameter	11 feet 4 feet 6 inches			9 feet.
(*d*) Heating surface (total)	2,764 square feet 608 square feet.			1,319 square feet.
(*e*) Grate surface (total)	67 square feet 14 square feet			36 square feet.
20. Discharge pipe in use (average number of feet).	499 feet	1,161 feet	2,256 feet	667 feet.
21. Diameter of discharge pipe	16 inches			12 inches.
22. Pontoons:				
(*a*) Number and material of those in use (average).	30, wood	30, wood	Wood	18 wooden pontoons.
(*b*) Dimensions	14 feet by 4 feet 10 inches by 3 feet 4 inches.			12 by 18 feet by 28 inches.
23. Revolutions per minute of propelling engines.	None			None.
24. Revolutions per minute of pumping engines.	250			235.

25. Type of agitator or cutter head	Taylor-Wharton (manganese)			Revolving blade and tooth.	
26. Diameter of cutter	5 feet			4 feet.	
27. Diameter of cutter shaft	6 inches			4½ inches.	
28. Type of suction head	Elliptical			Oblong.	
29. Revolutions per minute of cutter head	12			15.	
30. Average boiler pressure (gauge)	160 pounds	152 pounds	150 pounds	120 to 125 pounds.	
31. Kind of coal used	Bituminous			Bituminous.	
32. Average gauge pressure in discharge pipe.	35 pounds	35 pounds	35 pounds	25 pounds.	
33. Average vacuum in suction pipe	10 inches	10 inches	10 inches	20 inches.	
ATTENDANT PLANT.					
Towboat.		BRONX RIVER, N. Y.	PORT NEWARK, N. J.		
34. Name of tug attached to dredge		Colonel Thayer	George C. Van Tuyl and Alvin Brown (hired).	None.	
35. Number of crew		4			
36. Displacement		37 tons			
37. Draft:					
(*a*) Forward		5 feet			
(*b*) Aft		6 feet 5 inches			
Launches.					
38. Name	Billie B. (hired)		Billie B. (hired) (see Hudson River column).	Brunswick.	
39. Length	40 feet			60 feet.	
40. Beam	10 feet 4 inches			15 feet.	
41. Depth	5 feet 9 inches			6 feet.	
42. Draft	4 feet 3 inches			4 feet.	
43. Displacement	6 tons			43.5 tons.	
Barges.					
44. Identifying numbers of barges in use	Nos. 9 and 42, Hudson River	Nos. 9, 22, 26, and 40	Nos. 5, 9, and 42, Hudson River	Coal lighters Nos. 1 and 2.	Derrick lighter No. 2.
45. Usage	Coaling	Water and coal	Water and coal	Coal and water	Handling anchors, etc.
46. Displacement, light (each)	85 and 100 tons	85, 80, 75, and 70 tons	85 and 100 tons	No. 1—61 tons. No. 2—19.6 tons.	7 tons.
47. Capacity of barges (each)	200 and 250 tons	200, 175, 150, and 150 tons	200 and 250 tons	No. 1—200 tons. No. 2—40 tons.	8 tons.
WORK PERFORMED.					
48. Location of dredging	Hudson River, N. Y			See remarks.[1]	
49. Average depth before dredging	−6.1 L. L. W	−1 foot	−7.5 feet	5 to 15 feet (according to locality).	
50. Average depth after dredging	−13.8 L. L. W	−10 to 11 feet	−13 feet	8 to 20 feet (according to locality).	
51. Character of material dredged	Sand, gravel, clay, and cobbles	Gravel, sand, clay, and mud	Mud	Sand and mud.	
52. Rate of advance per hour (in feet straight ahead).	4.9	4.43	3.02	11.2 (by pumping time).	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name.	*De Witt Clinton.*									*Creighton.*		
WORK PERFORMED—continued.												
53. Amount dredged during the year	269,590 cubic yards			115,011 cubic yards			19,000 cubic yards			352,050 cubic yards.[1]		
54. Total amount dredged by this dredge at this locality.	do						do			1,118,707 cubic yards.		
55. Average amount dredged:												
(a) Per hour (pumping)	128.8 cubic yards			127.5 cubic yards			128 cubic yards			268.8 cubic yards.		
(b) Per day	1,954.9 cubic yards			1,389 cubic yards			1,900 cubic yards			2,070.9 cubic yards.		
56. Maximum amount dredged in one month.	58,250 cubic yards			49,623 cubic yards			19,000 cubic yards			63,681 cubic yards.		
57. Total number of days upon which any dredging was done.	124			81			10			170.		
58. Average number of working hours per working day.	13 hours 54.6 minutes			12 hours 10 minutes			12			12 hours 43 minutes.		
59. Maximum number of working hours per working day.	18 hours 33.6 minutes			16 hours 33 minutes			14			16.		
DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	2,110	25	47.79	903	40	31.38	149		10.18	1,309	25	14.948
(b) Handling pipe line	220	45	4.99	208	25	7.24	42		2.87	671	35	7.667
(c) Handling swinging wires (cleaning suction).	23	40	.53	12	5	.42	18		1.23	76	30	.873
(d) Going to and from wharf or anchorage.												
(e) Placing dredge	20	5	.47	26	20	.91				101	20	1.157
(f) Waiting for vessels to pass				45	30	1.57				2	40	.030
61. Time lost from work:												
(a) Changing location of plant	32	40	.73	72		2.50	103		7.04	638	10	7.285
(b) Bad weather	144		3.26	31	40	1.10	360		24.59	86	15	.985
(c) Washing boilers, and ordinary repairs.	5	50	.13	40	25	1.40				579	55	6.620
(d) Extraordinary repairs	278	40	6.32	622	15	21.61				568		6.484
(e) Other causes	775	55	17.57	461	40	16.03	588		40.16	3,334	10	38.061
(f) Sundays and holidays	804		18.21	456		15.84	204		13.93	1,392		15.890
62. Total hours in year	4,416		100.00	2,880		100.00	1,464		100.00	8,760		100.00
63. Total time at work	2,374	55	53.77	1,196		41.52	209		14.28	2,161	30	24.675
64. Total time lost from work	2,041	5	46.23	1,684		58.48	1,255		85.72	6,598	30	75.325

COST OF WORK.

Dredge.

65. Pay rolls	$15,492.23		$11,087.31		$5,274.97		$11,948.85	
66. Fuel for boilers	8,062.65		8,184.90		1,487.30		4,174.42	
67. Coal for galley	861.70		472.75		414.95		....	
68. Water	....		....		....		10.00	
69. Supplies, subsistence	5,120.45		2,440.15		1,555.53		5,985.40	
70. Supplies, engine room	1,621.79		555.58		50.83		554.75	
71. Other supplies	2,033.05		585.77		925.54		1,294.74	
72. Renewals or additions to outfit	400.70		270.00		....		1,687.70	
73. Ordinary repairs:								
(*a*) Hull	19.78		66.98		....		26.48	
(*b*) Machinery (exclusive of main dredging pump).	451.60		206.01		....		516.65	
74. Laundry, ice, miscellaneous expenses	243.50		39.36		28.68		203.81	
75. Total		$34,307.45		$23,908.81		$9,737.80		$26,402.80

Main dredging pump.

76. Diameter of runner	60 inches	60 inches	60 inches	60 inches.
77. Volute (lined or unlined)	Lined	Lined	Lined	Unlined.

	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(*a*) Volute																
(*b*) Runner			$594.60				$100.01								$379.67	
(*c*) Volute liners			182.15												163.84	
(*d*) Runner liners											$182.15					
(*e*) Head and back liners																
79. Miscellaneous repairs			20.70												275.00	
80. Total				$797.45				$100.01				$182.15				$818.51
Pipe line.																
81. Renewals:																
(*a*) Rubber sleeves			952.60				705.63								286.28	
(*b*) Pipe															2,052.87	
(*c*) Pontoons			155.17				46.20								30.32	
(*d*) Outfit															79.72	
82. Repairs			218.37				434.66									
83. Miscellaneous															71.03	
84. Total				$1,326.14				$1,186.49								$2,502.22

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*De Witt Clinton.*						*Creighton.*	
Towboats and launches.								
85. Pay rolls	....		$944.04		....		$2,565.41	
86. Fuel for boilers	....		427.00		[1] $33.75		1,230.21	
87. Coal for galley	....		32.00		31.40		48.50	
88. Water	....		....		....		....	
89. Supplies, subsistence	....		162.06		[2] 844.00		664.34	
90. Supplies, engine room	....		8.23		48.75		259.38	
91. Launch supplies	[1] $553.68		....		74.38		....	
92. Other supplies	....		....		[3] 384.73		129.05	
93. Renewals of or additions to outfit	....		....		....		268.70	
94. Ordinary repairs	....		....		....		433.44	
95. Laundry, ice, miscellaneous expenses, etc.	[2] 1,311.50		4.23		....		20.64	
96. Total		$1,865.18		$1,577.56		$1,417.01		$5,619.67
Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges	....		14.25		....		33.15	
98. Miscellaneous expenses	....		....	14.25	....		....	
99. Total field cost		$38,296.22		$26,787.12		$11,336.98		$35,376.35
100. Total field cost per cubic yard (cents).	14.2	....	23.2	....	59.6	....	10.049.	
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	7,780.70		5,890.06		2,557.66		3,952.46	
102. Extraordinary repairs to dredge:								
(a) Hull	3,586.57		....		....		268.49	
(b) Machinery (exclusive of main dredging pump).	1,618.79		....		....		2,778.30	
103. Extraordinary repairs to towboats and launches.	....		....		....		732.39	
104. Extraordinary repairs to barges	868.05		....		....		369.11	
		13,854.11		5,890.06		2,557.66		8,100.75
105. Total		$52,150.33		$32,677.18		$13,894.64		$43,477.10
106. Gross cost per cubic yard (cents)	$0.191	....	$0.284	....	$0.731	....	12.350.	

MISCELLANEOUS.				
107. Fuel consumed by dredge, tons or barrels.	1,398 tons	10,404 tons	257 tons	819 tons.
108. Fuel consumed by auxiliary plant, tons or barrels.	115 tons	67 tons		4,013 gallons gasoline; 2,986 gallons kerosene.
109. Total cost of all fuel	$9,478.03	$9,116.65	$1,967.40	$5,404.63.
110. Total water purchased (gallons)				11,700 gallons.
111. Cost of water per 1,000 gallons				$5 per 1,000.
112. Linear feet of pipe line built during year and cost per linear foot.				None.
113. Average increase of depth of channel cut over.	7 feet	11.5 feet	5.5 feet	4.68 feet.
114. Maximum dredging depth	32 feet			21 feet.
115. Number of shifts worked per day	3			2.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	[1] Gasoline. [2] Launch hire.	Above table covers operation on Bronx River from Jan. 1, 1917, to Apr. 6, 1917. The dredge was overhauled by Bushey & Son, New York, N. Y., Apr. 6-23. Dredge underwent repairs at Troy Apr. 23 to May 22, 1917. Dredging operations commenced on upper Hudson May 23, 1917.	Dredge out of commission from Oct. 28 to Nov. 7, being made ready for transfer for work at Port Newark Terminal, which transfer was effected on Nov. 8, 1917. Dredge operated but 10 days during period Nov. 8 to Dec. 31, 1917, due to crew being employed building bulkhead and to severe weather conditions. [1] Gasoline. [2] Hire of tug. [3] Hire of Billie B.	[1] 99,106 cubic yards, Venus Point dump ground, Savannah Harbor, Ga. 77,222 cubic yards, Barnwell Island closing dam, Savannah Harbor, Ga. 93,735 cubic yards, Fort Screven Wharf, Savannah Harbor, Ga. 19,400 cubic yards, Old River, Darien Harbor, Ga. 33,965 cubic yards, Florida Passage, inside waterway, Savannah, Ga., to Fernandina, Fla. 28,622 cubic yards, Three Mile Cut, inside waterway, Savannah, Ga., to Fernandina, Fla. Total 352,050 cubic yards. Dredge under repairs at Savannah, Ga., from Jan. 1 to Mar. 12, 1917; also under repairs at Savannah, Ga., from Dec. 19 to Dec. 31, 1917. Coal purchased by long tons from Jan. 1 to Oct. 31, 1917, and by short tons from Oct. 31 to Dec. 31, 1917.

NOTES.—Above table, items 34-113, covers operation on Hudson River from May 1 to Nov. 1, 1917.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Congaree.*	*Croatan.*	*Currituck.*
1. District	Charleston, S. C.	Wilmington, N. C.	Norfolk, Va.
2. When built	1907-8; rebuilt 1914	1911	1914.
3. Where built	Georgetown, S. C.; rebuilt Charleston, S. C.	Camden, N. J.	Baltimore, Md.
4. Builder	U. S. Engineer Department; rebuilt Valk & Murdoch Co.	Not known	Ellicott Machine Corporation.
5. Time to build	15 months; rebuild, 8½ months	do	9½ months.
6. Material of hull	Steel	Wood	Steel.
7. Contract cost of dredge	$30,000; rebuilding, $23,800.77	$32,000 [1]	$164,180.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) $1,485; (*b*) no record		(*a*) $6,020.41; (*b*) $25,388.
9. Length	104 feet	80 feet	150 feet.
10. Beam	32 feet	23 feet 6 inches	37 feet.
11. Depth	6 feet	8 feet	11 feet 10 inches.
12. Draft:			
(*a*) Forward	2 feet 6 inches	4 feet 11 inches	6 feet.
(*b*) Aft	2 feet 9 inches	do	Do.
13. Displacement (long tons)	430	235	805.
14. Number of crew	16	24	48.
15. Number, size, and type of propelling engines.	Nonpropelling	None	None.
16. Number, size, and type of pumping engines.	One 10 by 20 by 10, fore and aft, compound	One fore and aft, compound condensing, 10⅝ by 18⅝ by 10 inch stroke.	One vertical triple expansion; fourteen 22.5 and 40 inches by 20-inch stroke.
17. Cutter engines:			
(*a*) Diameter of cylinders	7 inches	8½ inches	11 inches.
(*b*) Stroke	10 inches	10 inches	14 inches.
18. Hauling engines:			
(*a*) Diameter of cylinders	7 inches	7 inches	8¼ inches.
(*b*) Stroke	10 inches	10 inches	12 inches.
19. Boilers:			
(*a*) Number and type	2 locomotive	2 Almy water tube	4 Scotch marine.
(*b*) Length	21 feet 1 inch	91 inches	12 feet.
(*c*) Diameter	5 feet	131 inches; height 117 inches	9 feet 7 inches.
(*d*) Heating surface (total)	987 square feet each boiler	1,608 square feet	4,685.6 square feet.
(*e*) Grate surface (total)	27 square feet each boiler	56.7 square feet	150 square feet.
20. Discharge pipe in use (average number of feet).	450 feet	700 feet	510 feet.
21. Diameter of discharge pipe	12 inches	15 inches	20 inches.
22. Pontoons:			
(*a*) Number and material of those in use (average)	5 wood	(*a*) 6 iron; (*b*) 24 wood	13 catamarans, wood.
(*b*) Dimensions	Length: 16 feet beam, 8 feet depth, 20 inches	(*a*) 2 cylinders, 3 feet diameter, 20 feet long; (*b*) 9 by 18 by 2 feet by 10 inches.	25 feet 6 inches long; 5 feet 6 inches wide; 5 feet 2 inches deep.
23. Revolutions per minute of propelling engines.	Nonpropelling	None	
24. Revolutions per minute of pumping engines.	250	200 and 250, average 225	148.

25. Type of agitator or cutter head	Ellicott spiral	Spiral	Ellicott.
26. Diameter of cutter	5 feet	4 feet	6 feet 7 inches.
27. Diameter of cutter shaft	4$\frac{1}{16}$ inches	5 inches	7 inches.
28. Type of suction head	Plain round	Oval	Oblong.
29. Revolutions per minute of cutter head	7	7	9.
30. Average boiler pressure (gauge)	90 pounds	175	180.
31. Kind of coal used	Bituminous, Clinchfield run-of-mine	Run-of-mine bituminous	Bituminous.
32. Average gauge pressure in discharge pipe.	18 pounds	12 pounds	17 pounds per square inch.
33. Average vacuum in suction pipe	15 inches	15 inches	7 inches.
ATTENDANT PLANT.			
Towboat.			
34. Name of tug attached to dredge	Richland	Neuse (part time)	Skycoak.
35. Number of crew	4	4	3.
36. Displacement	78.7 long tons	34.6	41 long tons.
37. Draft:			
(*a*) Forward	1 foot 6 inches	4 feet	3 feet 7 inches.
(*b*) Aft	2 feet 3 inches	do	5 feet 4 inches.
Launches.			
38. Name	Tee-Ree	Olive	Okisko.
39. Length	31 feet	34 feet	41 feet.
40. Beam	6 feet 6 inches	8 feet	11 feet 6 inches.
41. Depth	28 inches	Forward, 57 inches; mid, 38 inches; aft, 58 inches.	6 feet.
42. Draft	24 inches	28 inches	4 feet.
43. Displacement	2 long tons	5 tons	15 long tons.
Barges.			
44. Identifying numbers of barges in use	1	(*a*) 11; (*b*) L	Nos. 10 and 11.
45. Usage	Hauling coal	(*a*) coal; (*b*) water	Coal and equipment.
46. Displacement, light (each)	7 tons	(*a*) 150; (*b*) 20 tons	98 long tons.
47. Capacity of barges (each)	30 tons	(*a*) 150; (*b*) 20 tons	200 long tons.

WORK PERFORMED.			(2)	(3)	(4)	(5)	(6)	
48. Location of dredging	Waterways between Charleston and Alligator Creek, S. C.	Congaree River, S. C						Virginia Cut-Inland Waterway, Fishermans Island, Norfolk Harbor.
			feet.	*feet.*	*feet.*	*feet.*	*feet.*	
49. Average depth before dredging	2 feet	1 foot	9	5	3	5	5–10	8 feet; 2.5 feet; and 12 feet.
50. Average depth after dredging	4 feet	4 feet	11	7	6	10	8–20	13 feet; 11 feet; and 31 feet.
51. Character of material dredged	Sand, mud and shell	Sand and mud	Sand 80 per cent, mud 20 per cent					Sand, clay and mud; sand; and sand, clay and mud.
52. Rate of advance per hour (in feet straight ahead).	16	7	10.39					4.88.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Congaree.*						*Croatan.*			*Currituck.*		
WORK PERFORMED—continued.												
53. Amount dredged during the year	60,213			50,331			246,681 cubic yards			767,996 cubic yards.		
54. Total amount dredged by this dredge at this locality.	60,213			1,181,970			642,646.4 cubic yards, all locations			1,069,592 cubic yards; 137,784 cubic yards; 231,916 cubic yards.		
55. Average amount dredged:												
(*a*) Per hour (pumping)	106.96			81.2			151.7 cubic yards			393.5		
(*b*) Per day	700			572			1,762 cubic yards			4,954.8.		
56. Maximum amount dredged in one month.	16,635			14,519			73,348 cubic yards			150,000 cubic yards.		
57. Total number of days upon which any dredging was done.	86			88			140			155.		
58. Average number of working hours per working day.	8			10			14 hours 30 minutes			21 hours 18 minutes.		
59. Maximum number of working hours per working day.	10			10			22 hours 35 minutes			24 hours.		
DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(*a*) Pumping	563		11.07	618	15	16.84	1,626	10	18.563	1,951	25	22.28
(*b*) Handling pipe line	53	30	1.05	63	40	1.73	234		2.671	901	40	10.29
(*c*) Handling swinging wires (cleaning suction).	40		.79	26	30	.72	144	35	1.650	399	45	4.56
(*d*) Going to and from wharf or anchorage.											55	.01
(*e*) Placing dredge	10		.20	4	05	.13	21	45	.250			
(*f*) Waiting for vessels to pass				7	15	.20	4	55	.056	49	10	.56
61. Time lost from work:												
(*a*) Changing location of plant	456		8.96	58	15	1.59	218		2.490	482	20	5.50
(*b*) Bad weather				102	30	2.79	126	25	1.443	50	30	.58
(*c*) Washing boilers and ordinary repairs.	8		.16	20	55	.57	448	45	5.123	83	55	.96
(*d*) Extraordinary repairs	216	30	4.26	52		1.41				2,665	40	30.43
(*e*) Other causes	3,021		59.38	2,078	35	56.60	4,004	15	45.710	990	40	11.31
(*f*) Sundays and holidays	720		14.13	640		17.42	1,931	10	22.044	1,184		13.52
62. Total hours in year			100.00	3,072		100.00			100.00			100.00
63. Total time at work	666	30	13.10	719	45	19.60	2,031	25		3,302	55	37.70
64. Total time lost from work	4,421	30	86.90	2,952	15	80.40	6,728	35		5,457	5	62.30

COST OF WORK.

Dredge.

65. Pay rolls	$3,744.76		$3,423.41		$8,914.94		$30,226.48	
66. Fuel for boilers	1,147.19		3,063.04		6,611.23		32,406.41	
67. Coal for galley	29.68		29.75				132.45	
68. Water					32.08		220.89	
69. Supplies, subsistence	1,398.92		1,200.26		2,373.95		10,699.44	
70. Supplies, engine room	326.67		160.02		203.24		1,256.06	
71. Other supplies	386.00		8.67		147.45		539.40	
72. Renewals or additions to outfit	203.25		523.83		664.27		3,601.21	
73. Ordinary repairs:								
(a) Hull	13.50		1.50		187.37		2,001.00	
(b) Machinery (exclusive of main dredging pump).	24.00		23.37		924.58		10,752.51	
74. Laundry, ice, miscellaneous expenses	68.97		125.55		93.17		470.63	
75. Total		$7,342.94		$8,559.40		$20,152.28		$92,306.48

Main dredging pump.

76. Diameter of runner	5 feet	5 feet	54 inches	96 inches.
77. Volute (lined or unlined)	Unlined	Unlined	Lined front and back only	Lined front and back.

	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(a) Volute																
(b) Runner																
(c) Volute liners																
(d) Runer liners																
(e) Head and back liners											$179.00					
79. Miscellaneous repairs							$106.83									
80. Total								$106.83				$179.00				
Pipe line.																
81. Renewals:																
(a) Rubber sleeves			$161.23										50	975	$2,872.86	
(b) Pipe			493.30				281.76									
(c) Pontoons																
(d) Outfit																
82. Repairs											83.97				2,590.21	
83. Miscellaneous																
84. Total				$654.53				$281.76				$83.97				$5,463.07

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Congaree.*				*Croatan.*		*Creighton.*	
Towboats and launches.								
85. Pay rolls	$1,175.00		$980.00		$796.91		$837.83	
86. Fuel	290.11		395.00		778.42		1,177.05	
87. Coal for galley	14.84		13.00		5.00		....	
88. Water	.69		....		....		....	
89. Supplies, subsistence	400.28		260.00		269.95		432.32	
90. Supplies, engine room	285.79		50.00		53.03		132.34	
91. Launch supplies	50.23		259.17		....		....	
92. Other supplies	230.42		17.00		10.05		109.08	
93. Renewals of or additions to outfit	214.54		275.00		1.10		143.76	
94. Ordinary repairs	280.56		47.50		96.28		1,249.18	
95. Laundry, ice, miscellaneous expenses, etc.	186.34		20.00		110.63		....	
96. Total		3,128.80		$2,316.67		$2,121.37		$4,081.56
Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges	....		11.20		5.70		....	
98. Miscellaneous expenses	....		6.92	18.12	....	5.70	....	
99. Total field cost		$11,126.70		$11,282.78		$22,542.32		$101,851.11
100. Total field cost per cubic yard (cents).	18.47		22.41		9.1382		13.26.	
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	$1,985.98		....	$2,879.84	$1,928.53		[1]$28,732.84	
102. Extraordinary repairs to dredge:								
(*a*) Hull	124.80		....		....		613.64	
(*b*) Machinery (exclusive of main dredging pump).	1,135.97		$147.15		....		34,062.77	
103. Extraordinary repairs to towboats and launches.	92.60		....		....		833.93	
104. Extraordinary repairs to barges	....	3,339.35	....	3,026.99	....	1,928.53	1,006.50	65,249.68
105. Total		$14,465.62		$14,309.77		$24,470.85		$167,100.79
106. Gross cost per cubic yard (cents)	24.02		28.43		9.92		21.76.	

MISCELLANEOUS.				
107. Fuel consumed by dredge, tons or barrels.	277 short tons	259 short tons	1,037 short tons	5,824.56 tons bituminous coal.
108. Fuel consumed by auxiliary plant, tons or barrels.	387 gallons gasoline, 1,489 gallons kerosene.	545 gallons gasoline, 2,220 gallons kerosene.	70.77 barrels	105 barrels gasoline.
109. Total cost of all fuel	$1,481.82	$3,500.79	$7,389.65	$34,726.50.
110. Total water purchased (gallons)	None	None	82,500	224,760 gallons.
111. Cost of water per 1,000 gallons			40 cents	50 cents per M+48 cents per M towing charges.
112. Linear feet of pipe line built during year and cost per linear foot.	None	None		None.
113. Average increase of depth of channel cut over.	None; maintenance of channel	None; maintenance of channel	2 feet	11 feet.
114. Maximum dredging depth	15 feet	15 feet	30 feet	45 feet.
115. Number of shifts worked per day	1	1	1	3.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	The dredge began work on the waterways Jan. 26 and completed the work of dredging on June 29, 1917. Fuel used is bituminous coal, Clinchfield run of mine, purchased by the short ton.	The dredge began work on Aug. 23, 1917, and continued working on the Congaree River through the remainder of the year. Fuel used is bituminous coal, Clinchfield run of mine, purchased in carload lots of about 50 short tons.	[1] Contract cost of Croatan with part of equipment, $22,000; $10,000 expended by United States for additional pipe line and outfit. [2] Waterway from Pamlico Sound to Beaufort Inlet, 19,882 cubic yards. [3] Waterway from Core Sound to Beaufort Harbor, 12,709 cubic yards. [4] Waterway from Beaufort Harbor to New River, 131,005 cubic yards. [5] Beaufort Harbor, 1,386 cubic yards. [6] Working for private parties, 81,699 cubic yards. [7] Of this payroll, $1,053.80 was for care of plant when not in commission, $488.20 was for ordinary repairs to machinery, and $117.34 was for ordinary repairs to hull. Coal was purchased by the short ton of 2,000 pounds; gasoline by the gallon; weight of 1 gallon 6.6 pounds.	Operations of dredge Currituck during calendar year 1917: Jan. 1–Apr. 15, dredging on Virginia cut, inland waterway. Apr. 16–June 15, dredging on Fishermans Island fortifications. June 21–Oct. 14, undergoing repairs at Norfolk, Va. Oct. 15–Dec. 31, dredging on Engineer depot improvements, Norfolk Harbor, Va. [1] Includes $2,823.98 covering services of snagboat Roanoke, on Virginia Cut, $2,610.67 covering services of bank gang on same section, and one-half of the maintenance and operation charge of the inspection cruiser Paquippe against the inland waterway.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Dalecarlia.*	*Delatour.*	*Delta.*	*Epsilon.*
1. District	Washington, D. C	New Orleans, La	St. Louis, Mo., Mississippi River Commission.	St. Louis, Mo., Mississippi River Commission.
2. When built	1911 and 1912	1908–9	1897	1898.
3. Where built	Washington, D. C.[1]	Jeffersonville, Ind	Clifton Terrace, Ill	Grafton, Ill.
4. Builder	(1)	M. A. Sweeney Shipyard & Foundry Co.	New York Dredging Co	Springfield Boiler & Manufacturing Co.
5. Time to build	11 months	18 months	13 months	15 months.
6. Material of hull	Georgia pine	Wood	Steel	Steel.
7. Contract cost of dredge	(1)	$34,566.86	$124,940	$102,000.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) (1); (*b*) (1)	(*a*) $1,000; (*b*) $975		$3,000 (approximate).
9. Length	80 feet	112 feet	185 feet 6 inches	162 feet.
10. Beam	26 feet	30 feet	38 feet	40 feet.
11. Depth	7 feet	5 feet	8 feet 4 inches	7 feet 6 inches.
12. Draft:				
(*a*) Forward	4 feet 3 inches	4 feet	4 feet 10 inches	3 feet 8 inches, 5 feet from bow.
(*b*) Aft	3 feet 4 inches	4 feet 2 inches	do	4 feet 8½ inches, 2 feet from stern.
13. Displacement (long tons)	233.3	390	830	650.
14. Number of crew	15 men	18 single crew; 28 double crew	40	40.
15. Number, size, and type of propelling engines.		Two 12 by 48 inch lever poppet valve compound cutoff horizontal.		
16. Number, size, and type of pumping engines.	One 10 and 20 by 10 inch compound, condensing, direct connected.	1 compound condensing Morris vertical 12 by 14 inch.	One 22 and 48 by 24 inch vertical compound condensing.	Two 16 and 26 by 18 inch horizontal tandem compound.
17. Cutter engines:				
(*a*) Diameter of cylinders	8 inches	8 inches		
(*b*) Stroke	do	10 inches		
18. Hauling engines:				
(*a*) Diameter of cylinders	6 inches	12 inches	10 inches	6¾ inches.
(*b*) Stroke	10 inches	48 inches	12 inches	8 inches.
19. Boilers:				
(*a*) Number and type	One 150 horsepower water tube Worthington.	3, flue type	4 Heine water tube	6 Mississippi River cylindrical, flue.
(*b*) Length	10 feet 9 inches	20 feet	19 feet 6 inches	28 feet 5½ inches.
(*c*) Diameter	7 feet 7 inches wide, 11 feet 4 inches high.	One 42-inch and two 43-inch	20 feet 9 inches width of battery (2 batteries).	48 inches.
(*d*) Heating surface (total)	1,349.72 square feet	1,405.48 square feet	8,784 square feet	3,996 square feet.
(*e*) Grate surface (total)	40.1 square feet	48 square feet	142 square feet	154 square feet.
20. Discharge pipe in use (average number of feet).	122 feet	3,300 feet		
21. Diameter of discharge pipe	12 inches	13 inches and 15 inches	34 inches	32 inches.
22. Pontoons:				
(*a*) Number and material of those in use (average).	12; Georgia pine	10; wood		
(*b*) Dimensions	16 feet 8 inches by 7 feet by 2 feet and 16 feet by 6 feet 2 inches by 2 feet.	2 by 8 by 24 feet		

23. Revolutions per minute of propelling engines.	None	18		
24. Revolutions per minute of pumping engines.	243	210		
25. Type of agitator or cutter head	Ellicott, spiral	Wetherill Bros. cone-shape revolving.	Water-jet agitator	Water-jet agitator.
26. Diameter of cutter	3 feet 9 inches	4 feet		
27. Diameter of cutter shaft	3½ inches	3 11/16 inches		
28. Type of suction head	Ellicott solid with hood	12-inch gas pipe	Up and down stream with water jet.	Upstream with water jet.
29. Revolutions per minute of cutter head	12	15		
30. Average boiler pressure (gauge)	145	130 pounds		
31. Kind of coal used	Bituminous	Run of mine		
32. Average gauge pressure in discharge pipe.	18½ pounds	22 pounds		
33. Average vacuum in suction pipe	14 inches	18 inches		
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge				
35. Number of crew				
36. Displacement				
37. Draft:				
(*a*) Forward				
(*b*) Aft				
Launches.				
38. Name	Col. Leach	Maurepas		
39. Length	36.4 feet	36 feet 6½ inches		
40. Beam	10.5 feet	10 feet 6½ inches		
41. Depth	5 feet	4 feet		
42. Draft	2 feet forward, 3.5 feet aft	3 feet		
43. Displacement	8.3 tons	15 tons		
Barges.				
44. Identifying numbers of barges in use	1, No. 5	Nos. 3 and 4		
45. Usage	Coal	Fuel		
46. Displacement, light (each)	50 tons	63.4 tons		
47. Capacity of barges (each)	200 tons	238.9 tons		
WORK PERFORMED.				
48. Location of dredging	(2), (3), (4), and (5)	(See remarks.)		
49. Average depth before dredging	(2) 6.3, (3) 5.7, (4) 4.9, (5) 9.1	6.2 feet		
50. Average depth after dredging	(2) 15, (3) 8.4, (4) 8.3, (5) 11.8	10.5 feet		
51. Character of material dredged	60 per cent mud, 35 per cent sand, 5 per cent gravel.	Sand, silt, clay, mud, and shells		

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Dalecarlia.*			*Delatour.*			*Delta.*			*Epsilon.*		
WORK PERFORMED—continued.												
52. Rate of advance per hour (in feet straight ahead).	13.6 feet			13.5 feet (average)								
53. Amount dredged during the year	(2) 133,825, (3) 27,559, (4) 67,648, (5) 136,349.			340,952.3 cubic yards								
54. Total amount dredged by this dredge at this locality.	(2) 1,132,895, (3) 60,241, (4) 100,974, (5) 136,349.											
55. Average amount dredged:												
(a) Per hour (pumping)	198.3 cubic yards			160 cubic yards								
(b) Per day	1,707.4 cubic yards			1,509 cubic yards								
56. Maximum amount dredged in one month.	52,575 cubic yards			May, 62,410 cubic yards								
57. Total number of days upon which any dredging was done.	214			226								
58. Average number of working hours per working day.	8½			12								
59. Maximum number of working hours per working day.	11¾			19 hours, 15 minutes								
DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	1,842	45	21	2,130	45	24.33						
(b) Handling pipe line	181	15	2	165	50	1.89						
(c) Handling swinging wires (cleaning suction).	(6) 177	20	2	63	25	.72						
(d) Going to and from wharf or anchorage.				(1) 208		2.37						
(e) Placing dredge	83	5	1	111	30	1.27						
(f) Waiting for vessels to pass	6			39	35	.45						
61. Time lost from work:												
(a) Changing location of plant	273	20	3⅛	342	40	3.91						
(b) Bad weather	25	5	⅓	121	10	1.38						
(c) Washing boilers and ordinary repairs.	71	55	1	24	45	.28						
(d) Extraordinary repairs				128	40	1.47						
(e) Other causes	(7) 4,903	45	56	(8) 4,483	40	51.2						
(f) Sundays and holidays	1,195	30	13	940		10.73						
62. Total hours in year	8,760		100	8,760		100.00	8,760		100.00	8,700		100.00
63. Total time at work	2,200	25	26	2,719	5	31.04						
64. Total time lost from work	[illegible]	35	74	[illegible]	55	[illegible]						

COST OF WORK.																
Dredge.																
65. Pay rolls			$9,506.39				$13,776.87									
66. Fuel for boilers			3,591.69				7,406.88									
67. Coal for galley			30.24				89.91									
68. Water																
69. Supplies, subsistence			2,753.59				3,885.32									
70. Supplies, engine room			219.13				986.09									
71. Other supplies			232.22				1,240.03									
72. Renewals or additions to outfit			384.62				1,260.68									
73. Ordinary repairs:																
(a) Hull			70.74								$457.55				$1,472.55	
(b) Machinery (exclusive of main dredging pump).			132.26				148.08				986.88				2,049.49	
74. Laundry, ice, miscellaneous expenses.			163.82				1,026.50									
75. Total				$17,084.70				$29,820.36				$1,444.43				$3,522.04
Main dredging pump.																
76. Diameter of runner	50 inches				63 inches				84 inches				69 inches.			
77. Volute (lined or unlined)	Unlined				Lined				Unlined				Unlined.			
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(a) Volute	1	1,553	$161.35													
(b) Runner																
(c) Volute liners																
(d) Runner liners																
(e) Head and back liners																
79. Miscellaneous repairs			28.75	190.10			$229.50				$27.03				$1.02	
80. Total				$17,274.80				$229.50				$27.03				$1.02
Pipe line.																
81. Renewals:																
(a) Rubber sleeves	20	1,843	$427.20													
(b) Pipe							$145.00									
(c) Pontoons	[8] 14	1,843	1,596.00													
(d) Outfit																
82. Repairs																
83. Miscellaneous				2,023.20							$3.55				$10.04	
84. Total				$19,298.00				$145.00				$3.55				$10.04

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name.	*Dalecarlia.*		*Delatour.*		*Delta.*		*Epsilon.*	
Towboats and launches.								
85. Pay rolls	909.50		148.50		....		....	
86. Fuel for boilers	....		448.82		....		....	
87. Coal for galley	....		....		....		....	
88. Water	....		....		....		....	
89. Supplies, subsistence	(1)		58.96		....		....	
90. Supplies, engine room	409.33		5.00		....		....	
91. Launch supplies	29.17		78.84		....		....	
92. Other supplies	24.09		....		....		....	
93. Renewals of or additions to outfit	26.92		2.88		....		....	
94. Ordinary repairs	....		10.60		....		....	
95. Laundry, ice, miscellaneous expenses, etc.	....	1,399.01	....		....		....	
96. Total		$20,697.01		$789.60		....		....
Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges	....		....		....		....	
98. Miscellaneous expenses	....		....		....		....	
99. Total field cost		$20,697.01		$30,984.46		....		....
100. Total field cost per cubic yard (cents).	5.665		9.4					
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	1,320.00		1,203.78		93.87		249.27	
102. Extraordinary repairs to dredge:								
(a) Hull	....		....		....		....	
(b) Machinery (exclusive of main dredging pump).	....		281.54		....		....	
103. Extraordinary repairs to towboats and launches.	....		59.30		....		....	
104. Extraordinary repairs to barges	....		....	[1] 1,544.62	....		....	
105. Total		$22,017.01		$32,529.08		$1,568.88		$3,782.37
106. Gross cost per cubic yard (cents)	6		9.8					
MISCELLANEOUS.								
107. Fuel consumed by dredge, tons or barrels.	657.63 long tons		15,299 barrels coal					
108. Fuel consumed by auxiliary plant, tons or barrels.	37 7/50 of 50 gallons each		2,425 gallons gasoline					

109. Total cost of all fuel	$4,031.26	$7,981.61		
110. Total water purchased (gallons)				
111. Cost of water per 1,000 gallons				
112. Linear feet of pipe line built during year and cost per linear foot.				
113. Average increase of depth of channel cut over.	4.2 feet	4 feet 3 inches		
114. Maximum dredging depth	24 feet	13 feet		
115. Number of shifts worked per day	1	2		
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	[1] Hull was built in August, 1911, under contract with Skinner Shipbuilding Co., at Baltimore, Md., for $4,200. Machinery was transferred from an old hull in Dalecarlia Reservoir and installed on new hull by hired labor. Pontons, pipe line and some accessories were also transferred from old dredge and for these and the machinery the District of Columbia was reimbursed $6,480. The total cost of reconstruction was $18,530. Subsequent additions to machinery and outfit increased the first cost to $25,000. [2] Dredging in Anacostia River, D. C., Mar. 1 to May 10. [3] Dredging in Aquira Creek, Va., May 11 to May 31. [4] Dredging in Mattaponi River, Va., June 1 to July 23. [5] Dredging in Rappahannock River, Va., July 24 to Dec. 13. [6] Includes 52 hours, cleaning machinery and fires at close of working day. [7] Includes 23 hours and 5 minutes embankment repairs; 3,032 hours and 40 minutes idle time, only one crew employed; 1,416 hours dredge out of commission for overhauling and repairs; 432 hours laid up in Rappahannock River, Va., on account of ice. [8] Built. [9] Subsistence furnished on dredge; cost included in No. 69.	Other causes is made up of coaling, 107 hours 10 minutes; out of commission at night, 3,950 hours, and miscellaneous, 426 hours 30 minutes. This dredge operated in Bayou Plaquemine from Jan. 1 to Jan. 31, in Calcasieu Lake from Feb. 1 to Mar. 10, then was employed removing the Mermentau Dam, completing this work about Apr. 10 and was transferred to Fort St. Philip in connection with filling in reservation from Apr. 20 to June 10. It was then removed to Bayou Plaquemine for necessary dredging from June 20 to July 10 and returned to Fort St. Philip where she dredged on the fill until July 31. Again returned to Bayou Plaquemine for necessary dredging from Aug. 10 to Oct. 31. It was then transferred to Bayou Manchac, Amite River and mouth of Chefuncte River where she continued dredging until Dec. 31, 1917. [1] Snagging. [2] Total extra expense.	No dredging done by this dredge during the year.	No dredging done by this dredge during the year.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Etna.*	*Flad, Henry.*	*Florida.*	*Fort Chartres.*
1. District	Rock Island, Ill.	St. Louis (Mississippi River Commission).	Jacksonville, Fla.	St. Louis, Mo.
2. When built	1908–9	1901	1904–1905	1907–8.
3. Where built	Keokuk, Iowa	Grafton, Ill.	Jacksonville, Fla.	Dubuque, Iowa.
4. Builder	United States	Bucyrus Steam Shovel & Dredge Co.	Merrill-Stevens Engineering Co.	Dubuque Boat & Boiler Works.
5. Time to build	About 9 months	About 25 months	8 months	19 months.
6. Material of hull	Wood, steel frame	Steel	Steel	Steel.
7. Contract cost of dredge	$25,327.79 (no contract)	$122,400	$80,000	$176,795.56.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) Included above; (*b*) $6,376.38.		(*a*) $10,000; (*b*) not known	(*b*) Unknown.
9. Length	130 feet	192 feet	152 feet	197 feet.
10. Beam	28 feet	44 feet	29 feet 9 inches	45 feet.
11. Depth	5 feet	7 feet	7 feet	7 feet 6 inches.
12. Draft:				
(*a*) Forward	2 feet 6 inches	3 feet 10½ inches	4 feet 6 inches	4 feet.
(*b*) Aft	2 feet 7½ inches	5 feet	4 feet 9 inches	4 feet.
13. Displacement (long tons)	250	834	371	815.
14. Number of crew	19	43	23 (16-hour day)	
15. Number, size, and type of propelling engines.	None	Two 22-inch cylinders, 7-foot stroke, Mississippi River, side-wheel.	Two 15½ inches by 5 feet 6 inches Marshall valve gear.	Two 24 inches by 8 feet Mississippi River.
16. Number, size, and type of pumping engines.	One 13 and 25 by 16 inch cross-compound condensing.	Two 15 and 30 by 24 inches, horizontal tandem compound, condensing.	One 12 inch and 20 by 12 inch Westinghouse compound.	Two 16½ inch and 30 by 24 inch tandem, compound condensing.
17. Cutter engines:				
(*a*) Diameter of cylinders	None	None	No cutter engine	None.
(*b*) Stroke				
18. Hauling engines:				
(*a*) Diameter of cylinders	8¼ inches	7 inches	14 inches (also main hoisting engine for snagging derrick and clamshell bucket.	7 inches.
(*b*) Stroke	10 inches	do	18 inches	
19. Boilers:				
(*a*) Number and type	2 Bonson	7 Mississippi River cylindrical flue.	2 Clyde	6 Mississippi River.
(*b*) Length	18 feet	30 feet	11 feet 3 inches	30 feet.
(*c*) Diameter	60 inches	44 inches	8 feet	44 inches
(*d*) Heating surface (total)	2,960 square feet	3,948 square feet	2,174 square feet	3,925 square feet.
(*e*) Grate surface (total)	60 square feet	157.5 square feet	54 square feet	131 square feet.
20. Discharge pipe in use (average number of feet).	750	500	275	440.
21. Diameter of discharge pipe	18 inches	32 inches	12 inches	32 inches.
22. Pontoons:				
(*a*) Number and material of those in use (average).	15, wood, concrete deck	10, steel	12, wood (cypress)	9 steel.
(*b*) Dimensions	50 by 14 feet by 3 feet 4 inches	36 by 20 feet by 3 feet 6 inches	14 by 6 by 2 feet	47½ by 10 by 3 feet.

23. Revolutions per minute of propelling engines.	None	24	20	18.
24. Revolutions per minute of pumping engines.	225	132	285	140.
25. Type of agitator or cutter head	None	Water-jet agitator	Automatic drag	Water-jet sand agitator.
26. Diameter of cutter			No cutter	
27. Diameter of cutter shaft			No cutter shaft	
28. Type of suction head	Plain square	Upstream with water jet	Automatic drag	Dust pan.
29. Revolutions per minute of cutter head.	None		Not revolving	
30. Average boiler pressure (gauge)	145 pounds	144 pounds	100 pounds	150 pounds.
31. Kind of coal used	Bituminous lump and mine run.	Bituminous pea and slack	54¼ tons Imperial bituminous	Bituminous.
32. Average gauge pressure in discharge pipe.	17 pounds	18 pounds	7 pounds	5 pounds.
33. Average vacuum in suction pipe	22 inches (mercury)	14 inches	16 inches	18 inches.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge	None		None attached	
35. Number of crew				
36. Displacement				
37. Draft:				
(a) Forward				
(b) Aft				
Launches.				
38. Name	None		*Sirius.* *Valkyrie.*	
39. Length			32 feet 34 feet	
40. Beam			8 feet 8 feet	
41. Depth			3 feet 4 inches 4 feet	
42. Draft			3 feet 2 inches 3 feet 4 inches	
43. Displacement			3.2 tons 4.3 tons	
Barges.				
44. Identifying numbers of barges in use	No. 356 and No. 496		United States No. 1	
45. Usage	Coal		Fuel	Fuel.
46. Displacement, light (each)	50 long tons		50.5 tons	150 tons.
47. Capacity of barges (each)	132 long tons		80 tons	300 tons.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—**Continued.**

Name	*Etna.*	*Flad, Henry.*	*Florida.*				*Fort Chartres.*
WORK PERFORMED.			St. Johns River, Jacksonville to Palatka.	Palatka to Lake Harney.	Indian River.	Lake Crescent.	
48. Location of dredging	Miles 227, 233, 280, 300, 312, 326, 332, 342, 367, and 402.	Mississippi River below Cairo, Ill. (see remarks).					See remarks.
49. Average depth before dredging, feet	+4.8 to −2.2	See remarks	11.5	5.7	4	7.5	7.5 feet.
50. Average depth after dredging, feet	−3.8 to −7.7	do	15	9	6	9	12.1 feet.
51. Character of material dredged	Sand and mud	Sand, gravel, and mud	(1)	(1)	(1)	(1)	Alluvium, sand, gravel, clay, bowlders.
52. Rate of advance per hour (in feet straight ahead).	14.7	162	33	36	32	43	218 feet.
53. Amount dredged during the year, cubic yards.	252,694	332,605	158,771	103,587	93,473	11,796	610,000 cubic yards.
54. Total amount dredged by this dredge at this locality, cubic yards.	252,694		198,531	225,472	104,318	56,526	See remarks.
55. Average amount dredged:							
(a) Per hour (pumping), cubic yards.	287.7	678					1,065 cubic yards.
(b) Per day, cubic yards	3,239.7	8,315	1,936	1,500	908	1,966	75,000 cubic yards.
56. Maximum amount dredged in one month, cubic yards.	77,083.1	16,490	54,599	37,268	21,525	11,796	117,135 cubic yards.
57. Total number of days upon which any dredging was done.	78	40	82	69	103	6	81.
58. Average number of working hours per working day.	12 hours 34 minutes	14 hours 20 minutes	8	8	8	8	8.
59. Maximum number of working hours per working day.	16	24	8	8	8	8	16.

DISTRIBUTION OF TIME.	*Etna.* Hours.	Minutes.	Percentage.	*Flad, Henry.* Hours.	Minutes.	Percentage.	*Florida.* Hours.	Minutes.	Percentage.	*Fort Chartres.* Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	878	18	10.03	490	40	5.60	1,770		20.200	572		6.53
(b) Handling pipe line	117	41	1.34				12		.036	77		.08
(c) Handling swinging wires (cleaning suction).	18	49	.22	35	15	.40	2		.003	100		.11
(d) Going to and from wharf or anchorage.	187		2.13									

(e) Placing dredge	46	45	.53	61	50	.71	12		.036	132		1.43
(f) Waiting for vessels to pass	21	5	.24	2	35	.03				29		.03
61. Time lost from work:												
(a) Changing location of plant	182	40	2.09	212	40	2.43	304		3.469	221		2.52
(b) Bad weather	10	30	.12	61		.70				67		.76
(c) Washing boilers and ordinary repairs.	3	20	.04	120	15	1.37	84		.969	203		2.32
(d) Extraordinary repairs	8	18	.09				659		7.531			
(e) Other causes	6,709	34	76.59	7,727	45	88.21	4,513		51.596	7,219		84.62
(f) Sundays and holidays	576		6.58	48		.55	1,416		16.160	140		1.60
62. Total hours in year	8,760		100.00	8,760		100.00	8,760		100.000	8,760		100.00
63. Total time at work	1,269	38	14.49	590	20	6.74	1,796		20.275	910		8.18
64. Total time lost from work	7,490	22	85.51	8,169	40	93.26	6,964		79.725	7,850		91.82
COST OF WORK.												
Dredge.												
65. Pay rolls		$7,499.26			$10,679.31			$9,170.89			$12,855.54	
66. Fuel for boilers		5,018.94			5,232.96			5,901.58			6,926.15	
67. Coal for galley					15.60			188.30			110.16	
68. Water								172.92				
69. Supplies, subsistence		2,624.26			3,526.90			3,242.87			5,367.82	
70. Supplies, engine room		558.52			363.91			656.41			491.83	
71. Other supplies		110.17			346.55			589.91			306.25	
72. Renewals or additions to outfit		1,143.53						3,261.67				
73. Ordinary repairs:												
(a) Hull					1,946.94			144.55			806.30	
(b) Machinery (exclusive of main dredging pump).		441.38			6,567.28			76.57			5,317.82	
74. Laundry, ice, miscellaneous expenses		228.52			8.20			1,942.64			613.09	
75. Total			$17,624.58			$28,687.65			$25,348.31			$32,794.96
Main dredging pump.												
76. Diameter of runner	50 inches			84 inches								
77. Volute (lined or unlined)	Unlined			Lined								

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Etna.*				*Flad, Henry.*				*Florida.*				*Fort Chartres.*			
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(a) Volute																
(b) Runner																
(c) Volute liners																
(d) Runner liners																
(e) Head and back liners																
79. Miscellaneous repairs							$6.02								$829.63	
80. Total								$6.02								$829.63
Pipe line.																
81. Renewals:																
(a) Rubber sleeves	12		$514.80						24		$364.80					
(b) Pipe	[1]485		6,410.07						16		437.56					
(c) Pontoons			1.00													
(d) Outfit			18.32													
82. Repairs			53.02												2,527.65	
83. Miscellaneous							116.22								257.38	
84. Total				$6,997.21				$116.22				$802.36				$2,785.03
Towboats and launches.																
85. Pay rolls			$1,130.46												$297.02	
86. Fuel for boilers			148.41								$404.14					
87. Coal for galley																
88. Water																
89. Supplies, subsistence																
90. Supplies, engine room			.90													
91. Launch supplies											37.40					
92. Other supplies																
93. Renewals of or additions to outfit											193.93					

94. Ordinary repairs	14.54		....		105.80		....	
95. Laundry, ice, miscellaneous expenses, etc.	....		....		[1]1,215.00		....	
96. Total		$1,294.37		....		$1,956.27		$297.02
Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges	....		....		....		....	
98. Miscellaneous expenses	....		....		348.38	348.38	....	
99. Total field cost		$25,916.16		$28,809.89		$28,455.32		$36,706.64
100. Total field cost per cubic yard (cents).	10.25		8.66		6.358		6.44.	
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	640.52		$9,317.13		1,942.50		13,066.07	
102. Extraordinary repairs to dredge:								
(a) Hull	....		....		2,468.15		....	
(b) Machinery (exclusive of main dredging pump).	....		6,165.00		325.95		....	
103. Extraordinary repairs to towboats and launches.	8.00		....		....		....	
104. Extraordinary repairs to barges	....	648.52	....	15,482.13	....	4,736.60	....	13,066.07
105. Total		$26,544.68		$44,292.02		$33,191.92		$49,772.71
106. Gross cost per cubic yard (cents)	10.5		13.31		7.417		8.16.	
MISCELLANEOUS.								
107. Fuel consumed by dredge, tons or barrels.	898.42 short tons		2,205.84 tons		1,214 cords wood, 54.25 tons coal.		2,339.45 tons.	
108. Fuel consumed by auxiliary plant, tons or barrels.					1,610 gallons gasoline			
109. Total cost of all fuel	$3,121.11, $3.474 per ton		$5,248.56		$6,494.02		$7,036.31.	
110. Total water purchased (gallons)					86,460 gallons			
111. Cost of water per 1,000 gallons					$2			
112. Linear feet of pipe line built during year and cost per linear foot.	None				312 feet, $1.40			
113. Average increase of depth of channel cut over.	4.6 feet		1½ feet		2.5 feet		4.6 feet.	
114. Maximum dredging depth	21 feet						18 feet.	
115. Number of shifts worked per day	2						2.	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

<table>
<tr><th>Name</th><th>Etna.</th><th>Flad, Henry.</th><th>Florida.</th><th>Fort Chartres.</th></tr>
<tr><td></td><td>Remarks.
[1] Linear feet.</td><td>Remarks.
Dredging at the following localities:<table>
<tr><th rowspan="2">Locality.</th><th rowspan="2">Miles below Cairo.</th><th colspan="2">Average depth, feet.</th></tr>
<tr><th>Before dredging.</th><th>After dredging.</th></tr>
<tr><td>Gayoso</td><td>104</td><td>8</td><td>10</td></tr>
<tr><td>Blue Grass</td><td>132</td><td>10½</td><td>12½</td></tr>
<tr><td>River Styx</td><td>139</td><td>10</td><td>11½</td></tr>
</table></td><td>Remarks.
[1] Sand and mud.
[2] Hire of launches, the operators of which were paid by owner of boats, and subsisted by United States.</td><td>Remarks.
Includes proportional charge for care of idle plant, materials, etc., Mississippi River between mouths of Ohio and Missouri Rivers:<table>
<tr><th>Locality.</th><th>Cubic yards.</th></tr>
<tr><td>Perry Towhead (upper)</td><td>43,900</td></tr>
<tr><td>Cliff Cave</td><td>45,000</td></tr>
<tr><td>Waters Point</td><td>54,600</td></tr>
<tr><td>Perry Towhead (foot)</td><td>93,100</td></tr>
<tr><td>Ste. Genevieve Bend</td><td>56,900</td></tr>
<tr><td>La Cours Island</td><td>35,400</td></tr>
<tr><td>Grand Tower</td><td>29,500</td></tr>
<tr><td>Cherokee Landing</td><td>54,600</td></tr>
<tr><td>Kemper</td><td>34,200</td></tr>
<tr><td>Danby Towhead to Bar Light</td><td>22,400</td></tr>
<tr><td>Brewer Point</td><td>30,500</td></tr>
<tr><td>Aluminum Ore Dock [1]</td><td>9,100</td></tr>
<tr><td>Pulltight</td><td>22,100</td></tr>
<tr><td>Twin Hollow</td><td>33,600</td></tr>
<tr><td>Illinois Southern R. R. incline [1]</td><td>33,400</td></tr>
<tr><td>U. S. Engineer depot [1]</td><td>11,700</td></tr>
<tr><td></td><td>610,000</td></tr>
</table>[1] Not in main channel.</td></tr>
</table>

Name	*Fort Gage.*	*Gamma.*	*Gillespie, Gen. G. L.*
1. District	St. Louis, Mo.	St. Louis, Mo., Mississippi River Commission.	First New York.
2. When built	1907-08.	1897.	1915.
3. Where built	Dubuque, Iowa.	Jeffersonville, Ind.	Baltimore, Md.
4. Builder	Dubuque Boat & Boiler Works.	Bucyrus Steam Shovel & Dredge Co.	Ellicott Machine Corporation.
5. Time to build	16 months.	About 1 year.	About 10 months.
6. Material of hull	Steel.	Steel.	Steel.
7. Contract cost of dredge	$177,978.98.	$85,530.60.	$157,909.[1]
8. (*a*) Cost of outfit; (*b*) cost of pipe line.	(*b*) Unknown.	(*a*) $3,000 (approximate).	(*a*) $2,615;[2] (*b*) $15,708.50.[3]
9. Length	197 feet.	165 feet 6 inches.	150 feet.
10. Beam	45 feet.	38 feet.	37 feet.
11. Depth	7 feet 6 inches.	7 feet 10 inches.	11 feet 10 inches.
12. Draft:			
(*a*) Forward	4 feet.	4 feet.	7.4 feet.
(*b*) Aft.	do.	4 feet 2 inches 30 feet from stern.	7.5 feet.
13. Displacement (long tons)	815.	581.	880.
14. Number of crew	48.	36.	50 to 65.
15. Number, size, and type of propelling engines.	Two, 24 inches by 8 feet, Mississippi River.	Two high pressure, 15 inches; low pressure, 30 inches; 20-inch stroke.	None.
16. Number, size, and type of pumping engines.	Two, 16½ inches and 30 by 24 inches, tandem, compound condensing.	One, 18 and 32½ by 22 inch horizontal cross compound, condensing.	One 14, 22½ and 40 by 20 inch, triple expansion.
17. Cutter engines:			
(*a*) Diameter of cylinders	None.	None.	11 inches.
(*b*) Stroke			14 inches.
18. Hauling engines:			
(*a*) Diameter of cylinders	7 inches.	7 inches.	8½ inches.
(*b*) Stroke	do.	do.	12 inches.
19. Boilers:			
(*a*) Number and type	6 Mississippi River.	6 Mississippi River, cylindrical, flue.	4 Scotch marine.
(*b*) Length	30 feet.	28 feet.	12 feet.
(*c*) Diameter	44 inches; three 10-inch flues; two 11-inch flues.	48 inches.	10 feet.
(*d*) Heating surface (total)	3,925 square feet.	3,696 square feet.	4,685.6 square feet.
(*e*) Grate surface (total)	131 square feet.	120 square feet.	300 square feet.
20. Discharge pipe in use (average number of feet).	422 feet.	500 feet.	3,200 feet.
21. Diameter of discharge pipe	32 inches.	24 inches.	20 inches.
22. Pontoons:			
(*a*) Number and material of those in use (average).	9; steel.	Steel.	Wood and steel, 5 per 100 feet.
(*b*) Dimensions	47½ by 16 by 3 feet.	36 by 14 by 3 feet.	Wood, 16 by 8 by 4 feet; steel, 20½ by 4 by 4 feet.
23. Revolutions per minute of propelling engines.	18.	144.	None.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Fort Gage.*	*Gamma.*	*Gillespie, Gen. G. L.*	
24. Revolutions per minute of pumping engines.	150	141	175	155.4 (average).
25. Type of agitator or cutter head	Water-jet sand agitator	Hydraulic jet	Ellicott open blade cutter with renewable tips.	
26. Diameter of cutter			6 feet 7 inches	
27. Diameter of cutter shaft			7 inches	
28. Type of suction head	Dust pan	Water jet agitator, upstream	Elliptical	
29. Revolutions per minute of cutter head			14	
30. Average boiler pressure (gauge)	160	124 pounds	190	
31. Kind of coal used	Bituminous	Bituminous, pea and slack	Bituminous	
32. Average gauge pressure in discharge pipe.	5 pounds	12 pounds	42 pounds per square inch	29.5.
33. Average vacuum in suction pipe	20 pounds	15 inches	10 inches	12 inches.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge			Col. Thayer	Col. Thayer.
35. Number of crew			4	4.
36. Displacement			37 tons	37 tons.
37. Draft:				
(*a*) Forward			5 feet 5 inches	5 feet 5 inches.
(*b*) Aft			7 feet	7 feet.
Launches.				
38. Name			None	None.
39. Length				
40. Beam				
41. Depth				
42. Draft				
43. Displacement				
Barges.				
44. Identifying numbers of barges in use	5		28, 30, 40 (Hudson River)	17, 27, 28 (Hudson River).
45. Usage	Coal		Coal and water	Coal.
46. Displacement, light (each)	860 tons			
47. Capacity of barges (each)	717 tons		Approximately 400 tons.	180 tons, 200 tons, 200 tons.

WORK PERFORMED.				
48. Location of dredging	See remarks	Mississippi River below Cairo, Ill. (see remarks).	Jamaica Bay, Rockaway	Hudson River, N. Y.
49. Average depth before dredging		See remarks		Minus 11.4 feet L. L. W.
50. Average depth after dredging		do		Minus 14.06 feet L. L. W.
51. Character of material dredged	Sand and gravel	Mud, sand, and gravel	Sand	Sand and clay.
52. Rate of advance per hour (in feet straight ahead).		116		14.35 feet (average).
53. Amount dredged during the year	592,477 cubic yards	289,776 cubic yards	1,221 cubic yards [4]	62,510 cubic yards.
54. Total amount dredged by this dredge at this locality.	See remarks		do [4]	Do.
55. Average amount dredged:				
(a) Per hour (pumping)	1,105 cubic yards	374 cubic yards	436.24 cubic yards	556.8 cubic yards.
(b) Per day	10,394 cubic yards	6,586 cubic yards	Approximately 7,000 cubic yards.	6,251 cubic yards.
56. Maximum amount dredged in one month.	250,086 cubic yards	72,006 cubic yards	248,970 cubic yards	62,510 cubic yards.[1]
57. Total number of days upon which any dredging was done.	57	44	164	10.
58. Average number of working hours per working day.	9	17 hours 40 minutes.	22	11 hours 13¼ minutes.
59. Maximum number of working hours per working day.	13 hours 40 minutes	24	24	17.

DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	536		6.1	607	20	6.93	2,816	25	47.90	113	15	3.93
(b) Handling pipe line	20		.2				860	35	14.64	59	45	2.07
(c) Handling swinging wires (cleaning suction)	49	25	.6	21	20	.24	98	15	1.67	11	15	.39
(d) Going to and from wharf or anchorage	10	20	.1				48		.81			
(e) Placing dredge	53	5	.6	140	35	1.61	4		.07	4		.14
(f) Waiting for vessels to pass	8	50	.1	6	5	.07						
61. Time lost from work:												
(a) Changing location of plant	210	10	2.4	276	35	3.16				82	20	2.86
(b) Bad weather	57	30	.7	43	25	.50	268	20	4.56			
(c) Washing boilers and ordinary repairs	72		.8	231	50	2.65	4		.07			
(d) Extraordinary repairs	113		1.3	72		.82	559		9.51	2,159	35	74.99
(e) Other causes	7,407	40	84.6	7,180	50	81.97	658	25	11.20	23	50	.83
(f) Sundays and holidays	222		2.5	180		2.06	563		9.57	426		14.79
62. Total hours in year	8,760		100.00	8,760		100.00	8,760		100.00	8,760		100.00
63. Total time at work	677	40	7.7	775	20	8.85	3,827	15	65.09	188	15	6.53
64. Total time lost from work	8,082	20	92.3	7,984	40	91.15	2,052	45	34.91	2,691	45	93.47

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Fort Gage.*		*Gamma.*		*Gillespie, Gen. G. L.*			
COST OF WORK.								
Dredge.								
65. Pay rolls	$13,022.92		$10,032.66		$30,733.54		$4,815.69	
66. Fuel for boilers	7,000.06		5,258.91		18,738.86		1,811.68	
67. Coal for galley	61.20		11.60		....		(²)	
68. Water	....		....		1,025.16		....	
69. Supplies, subsistence	5,907.90		3,866.54		10,007.45		1,962.44	
70. Supplies, engine room	190.69		503.37		2,144.07		125.00	
71. Other supplies	957.75		422.44		2,512.42		1,976.02	
72. Renewals or additions to outfit	....		....		3,806.98		7,074.00	
73. Ordinary repairs:								
(*a*) Hull	853.85		1,589.40		13.33		115.25	
(*b*) Machinery (exclusive of main dredging pump)	4,880.42		2,326.59		2,162.31		....	
74. Laundry, ice, miscellaneous expenses	270.39		181.10		965.08		27.50	
75. Total		$33,945.18		$24,192.61		$72,109.20		$17,907.58
Main dredging pump.								
76. Diameter of runner	....		82 inches		96 inches		96 inches.	
77. Volute (lined or unlined)	....		Lined		Lined		Lined.	

	Fort Gage.				*Gamma.*				*Gillespie, Gen. G. L.*						
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.
78. Renewals:															
(*a*) Volute	......	......	......		......	......	......		......	......	$237.16		......	......	$1,576.00
(*b*) Runner	......	......	......		......	......	......		......	......	......		......	......	......
(*c*) Volute liners	......	......	......		......	......	......		......	......	579.00		......	......	......
(*d*) Runner liners	......	......	......		......	......	......		......	......	......		......	......	......
(*e*) Head and back liners	......	......	......		......	......	......		......	......	1,012.36		......	......	......
79. Miscellaneous repairs	......	......	$724.17		......	......	12.35		......	......	......		......	......	......
80. Total	......	......	......	$34,669.35	......	......	......	$12.35	......	......	......	[illegible]	......	......	......

Pipe line.																
81. Renewals:																
(a) Rubber sleeves							$				2,765.59					
(b) Pipe											102.04					
(c) Pontoons											637.63					
(d) Outfit																
82. Repairs			2,354.70								714.55				1,604.39	
83. Miscellaneous			220.82				129.62				981.42					
84. Total				$2,575.52				$129.62				$5,201.23				
Towboats and launches.																
85. Pay rolls			$294.37								$2,824.23				$275.33	
86. Fuel for boilers											1,437.82				120.00	
87. Coal for galley															4.00	
88. Water											229.60					
89. Supplies, subsistence											507.65				55.92	
90. Supplies, engine room											15.00					
91. Launch supplies																
92. Other supplies											92.00					
93. Renewals of or additions to outfit											2.40					
94. Ordinary repairs											69.09					
95. Laundry, ice, miscellaneous expenses, etc.											14.35				.50	
96. Total				$294.37								$5,192.14				$455.75
Bargès (amounts chargeable to dredge).																
97. Ordinary repairs											31.68					
98. Miscellaneous expenses											2,643.55					
99. Total field cost				$37,539.24				$24,334.58				$87,906.32				
100. Total field cost per cubic yard (cents).	6.25				8.4											
Extra expenses.																
101. Office expenses, superintendence, surveys, etc.[1]			14,036.03				$5,773.89				1,679.68				1,247.65	
102. Extraordinary repairs to dredge:																
(a) Hull																
(b) Machinery (exclusive of main dredging pump).							607.50				28.96				5,134.53	
103. Extraordinary repairs to towboats and launches.											58.00					
104. Extraordinary repairs to barges											714.86					
105. Total				$51,575.27				$30,715.97				$90,387.82				$24,745.51
106. Gross cost per cubic yard (cents)	8.57				10.6											

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Fort Gage.*	*Gamma.*	*Gillespie, Gen. G. L.*	
MISCELLANEOUS.				
107. Fuel consumed by dredge, tons or barrels.	2,609.04 tons	1,870.6 tons	3,918 tons	302 tons.
108. Fuel consumed by auxiliary plant, tons or barrels.			306 tons	20½ tons.
109. Total cost of all fuel	$7,061.26	$5,270.51	$20,176.68	$1,935.68.
110. Total water purchased (gallons)			2,518.448 gallons	None.
111. Cost of water per 1,000 gallons			$0.50	Do
112. Linear feet of pipe line built during year and cost per linear foot.				
113. Average increase of depth of channel cut over.	4.3 feet	5 feet		
114. Maximum dredging depth	18 feet		40 feet	
115. Number of shifts worked per day	2		3	

Remarks.

Mississippi River between mouths of Ohio and Missouri Rivers:

Localities.	Cubic yards.
St. Louis Stock Yards¹	33,900
Twin Hollows	46,000
St. Nichols Rock	45,200
Little Rock R. R. incline¹	273,800
Ste. Genevieve Island	29,800
Head Moro Island	37,500
Ste. Genevieve Bend¹	5,400
Grand Tower Landing¹	62,200
Grand Tower Crossing	700
Brewer Point	66,200
	600,700

Remarks.

. Dredging at the following places:

Locality.	Miles below Cairo.	Average depth, feet.	
		Before dredging.	After dredging.
Foot Cow Island	253	12	12½
Fords	710	12	12½
Red River	766	7.7	12
Mouth Old River	764	9	11
Loosahatchie River	228	4–6	10 14

Remarks.

Above table, Items 34 to 113, covers operation of dredge at Rockaway Point, L. I., from Apr. 28 to Dec. 31, 1917.

[1] Includes $60,150 allowed for dredge Capt. Andrew Talcott, turned in as part of purchase price.

[2] Large part of outfit included in purchase price of dredge.

[3] $8,708.50 for pipe and $7,000 for steel pontoons, wooden pontoons of Talcott are used. Their value is low and not included.

[4] Yardage is determined by cross section of fill and estimated pump yardage.

Remarks.

Table above is for operation and maintenance out of commission from Jan. 1 to Apr. 28, 1917, on the Upper Hudson River, N. Y.

Dredge loaned to the second district for work at Rockaway Point, L. I., Apr. 28, 1917.

[1] Includes the time dredge was out of commission and being repaired at Troy, N. Y.

[2] Included above.

Name	*Geyser.*	*Guadalupe.*	*Gulfport.*
1. District	Rock Island, Ill	Galveston, Tex	Mobile, Ala.
2. When built	Hull rebuilt 1912	1908	1913.
3. Where built	Milan, Ill	Victoria, Tex	Baltimore, Md.
4. Builder	United States	U. S. Engineer depot	Ellicott Machine Corporation.
5. Time to build	About 3 months	4 months	4 months to complete after approval of contract.
6. Material of hull	Steelframe and deck, balance fir	Wood	Steel.
7. Contract cost of dredge	$19,551.83 (no contract)	$58,000	$168,446.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) Included above; (*b*) $3,499.72		(*a*) $6,967; (*b*) $24,587.
9. Length	001 feet	118 feet	150 feet.
10. Beam	24 feet	29 feet 3 inches	40 feet.
11. Depth	4 feet 5 inches	5 feet 11 inches	11 feet 6 inches.
12. Draft:			
(*a*) Forward	2.9 feet	5 feet	6 feet.
(*b*) Aft	do	do	Do.
13. Displacement (long tons)	145		886.
14. Number of crew	19 men	38	42.
15. Number, size, and type of propelling engines.	None	Two 12 by 48 inch Western River	None.
16. Number, size, and type of pumping engines.	One 12 and 22 by 12 inch cross compound condensing.	One 14 and 22 by 12 inch vertical compound.	One 14-inch, 22½-inch, and 40 by 20 inch triple expansion.
17. Cutter engines:			
(*a*) Diameter of cylinders	None	7 inches	11 inches.
(*b*) Stroke	do	do	14 inches.
18. Hauling engines:			
(*a*) Diameter of cylinders	4 inches	10 inches	8¼ inches.
(*b*) Stroke	6 inches	12 inches	12 inches.
19. Boilers:			
(*a*) Number and type	Two Mississippi River type	2 Scotch marine	4 Scotch marine.
(*b*) Length	18 feet	10 feet	12 feet.
(*c*) Diameter	35 inches	7 feet 6 inches	9 feet 7 inches.
(*d*) Heating surface (total)	554 square feet	794 square feet	4,685.6 square feet.
(*e*) Grate surface (total)	24.5 square feet	None (oil burning)	150 square feet.
20. Discharge pipe in use (average number of feet).	533 feet. m	200 feet	1,200 feet.
21. Diameter of discharge pipe	15 inches	12 inches	20 inches.
22. Pontoons:			
(*a*) Number and material of those in use (average).	12, wood	7, steel	58, steel.
(*b*) Dimensions	One (49 by 16 by 2 feet) and eleven (44 by 16 by 2 feet).	Length, 20 feet 8 inches; diameter, 2 feet 6 inches.	23 by 4 by 4 feet.
23. Revolutions per minute of propelling engines.	None	12	None.
24. Revolutions per minute of pumping engines.	240	225	150.
25. Type of agitator or cutter head	None	Open rotary	Ellicott spiral.
26. Diameter of cutter	do	3 feet 10 inches	6 feet 7 inches (over blades).
27. Diameter of cutter shaft	do	4½ inches	7 inches (increased to 8¾ inches at cuttor).
28. Type of suction head	Plain, square	Open	Ellicott.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Geyser.*	*Guadalupe.*		*Gulfport.*
29. Revolutions per minute of cutter head	None	18		11.
30. Average boiler pressure (gauge)	160 pounds	120 pounds per square inch		179 pounds.
31. Kind of coal used	Bituminous lump and mine run	Crude oil		Bituminous.
32. Average gauge pressure in discharge pipe.	12 pounds	9 pounds per square inch		28 pounds.
33. Average vacuum in suction pipe	21 inches	11 inches		9 inches.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge	None regularly			Tuscaloosa.
35. Number of crew				9.
36. Displacement				212 tons.
37. Draft:				
(*a*) Forward				5 feet 6 inches.
(*b*) Aft				8 feet 6 inches.
Launches.		Hill.	Hidalgo.	
38. Name	None			Rettig.
39. Length		31 feet, 5 inches	28 feet 3 inches	40 feet 9 inches.
40. Beam		8 5 inches	8 feet 3 inches	12 feet 3 inches.
41. Depth		4 feet	4 feet	4 feet 6 inches.
42. Draft		3 feet 2 inches	3 feet	4 feet.
43. Displacement		7 tons	7 tons	25 tons.
Barges.				
44. Identifying numbers of barges in use	493; 494	3 (no names or numbers)		L and P.
45. Usage	Coal	Oil, water and storage		Coal and water.
46. Displacement, light (each)	40 long tons			104 tons and 35 tons.
47. Capacity of barges (each)	90 long tons			340 tons and 80 tons.

WORK PERFORMED.				
48. Location of dredging	Miles 3, 4, 5, and 10, vicinity of St. Paul, Minn.	(1)	(1)	Middle Grounds, Lake Pontchartrain, La.
49. Average depth before dredging	3.2 to 4.3 feet		(2)	6 feet 5 inches.
50. Average depth after dredging	7.4 to 9.9 feet		(3)	9 feet.
51. Character of material dredged	Sand and gravel		Mud and sand	Mud, clay, and sand.
52. Rate of advance per hour (in feet straight ahead).	12 feet		22.55 feet	
53. Amount dredged during the year	215,458 cubic yards		3,643,942.5 cubic yards within theoretical section.[4]	287,582.63.
54. Total amount dredged by this dredge at this locality.	do		4,038,017.3 cubic yards during calendar year 1917.[5]	287,582.63.
55. Average amount dredged:				
(a) Per hour (pumping)	185.58 cubic yards		1,135.11 cubic yards	448 cubic yards.
(b) Per day	1,941 cubic yards		20,244.13 cubic yards	7,773 cubic yards.
56. Maximum amount dredged in one month.	63,381 cubic yards	99,604 cubic yards	655,123.5 cubic yards	170,550 cubic yards.
57. Total number of days upon which any dredging was done.	111	143	180	37.
58. Average number of working hours per working day.	13 hours 3 minutes	13 hours 16 minutes	20	21.
59. Maximum number of working hours per working day.	16	16	24	23 hours 57 minutes.

DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage	Hours.	Minutes.	Percentage	Hours.	Minutes.	Percentage	Hours.	Minutes.	Percentage
60. Time at work:												
(a) Pumping	1,161		13.25	1,615	15	18.44	3,210	13	43.15	642	44	41
(b) Handling pipe line	66	40	.76	165	40	1.89	254	42	3.42	74	37	5
(c) Handling swinging wires (cleaning suction).	156	5	1.78	91	40	1.05	31	55	.43	9	47	.6
(d) Going to and from wharf or anchorage.	126	10	1.44							24	20	1.5
(e) Placing dredge	22		.25	22	35	.26	29	17	.39	4	17	.4
(f) Waiting for vessels to pass	21	10	.24	2		.02				21	30	1.5
61. Time lost from work:												
(a) Changing location of plant	98	10	1.12	537	10	6.13	446	38	6.00	441	15	28
(b) Bad weather				129	25	1.48	337	25	4.54	15	25	1
(c) Washing boilers and ordinary repairs.	76	45	.88	142	50	1.63	727	7	9.77	60		4
(d) Extraordinary repairs	26	50	.31	777	25	8.87				18		1
(e) Other causes	6,429	10	73.39	4,081	30	46.59	[6]1,070	43	14.39	56	5	4
(f) Sundays and holidays	576		6.58	1,194	30	13.64	1,332		17.91	192		12
62. Total hours in year	8,760		100.00	8,760		100.00	760		100.00	8,760		100.0
63. Total time at work	1,553	5	17.72	1,897	10	21.66	3,526	7	47.39	777	15	49.8
64. Total time lost from work	7,206	55	82.28	6,862	50	78.34	3,913	53	52.61	782	45	50.2

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Geyser.*		*Guadalupe.*		*Gulfport.*			
COST OF WORK.								
Dredge.								
65. Pay rolls	$7,030.95		$17,451.96		$22,569.02		$3,867.36	
66. Fuel for boilers	5,526.52		6,233.23		[1] 9,831.25		4,866.78	
67. Coal for galley	....		334.15		[1] 72.68		35.75	
68. Water	....		132.58		102.65		....	
69. Supplies, subsistence	1,951.32		5,465.41		6,758.30		1,008.97	
70. Supplies, engine room	514.82		594.06		2,533.83		812.05	
71. Other supplies	544.32		678.24		1,620.83		300.50	
72. Renewals or additions to outfit	417.02		4,361.71		3,979.45		872.01	
73. Ordinary repairs:								
(a) Hull	....		264.43		1,856.01		40.20	
(b) Machinery (exclusive of main dredging pump).	163.12		179.45		1,434.15		5.00	
74. Laundry, ice, miscellaneous expenses.	184.62		808.50		279.39		36.46	
75. Total		$16,332.69		$36,503.72		$51,032.56		$11,845.08
Main dredging pump.								
76. Diameter of runner	52 inches				96 inches			
77. Volute (lined or unlined)	Unlined				Unlined			

	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.
78. Renewals:												
(a) Volute	......	......	......	......	......	......	......	......	......	......	......	......
(b) Runner	......	......	$118.00	......	......	......	......	......	......	......	......	......
(c) Volute liners	......	......	3.68	......	......	......	......	......	......	......	......	......

(*d*) Runner liners																
(*e*) Head and back liners																
79. Miscellaneous repairs							$147.63									
80. Total				121.68				147.63								
Pipe line.																
81. Renewals:																
(*a*) Rubber sleeves	9		325.35				454.80		122	(8)	$3,850.68					
(*b*) Pipe			93.25				301.74									
(*c*) Pontoons							3,136.21									
(*d*) Outfit							183.15									
82. Repairs							16.77				1,982.37				$30.00	
83. Miscellaneous							447.72									
84 Total				418.60				4,540.39				5,833.05				30.00
Towboats and launches.																
85. Pay rolls			$199.89				$1.442.58				$6,036.80				$1,326,48	
86. Fuel for boilers			39.60				1,611.47				[7] 1,265.17				928.01	
87. Coal for galley							7.50				[7] 25.46					
88. Water											15.12					
89. Supplies, subsistence							128.56				1,755.67				404.55	
90. Supplies, engine room											171.84					
91. Launch supplies			9.90								2,088.45					
92. Other supplies											4.49				24.30	
93. Renewals of or additions to outfit							154.79				24.04				524.35	
94. Ordinary repairs			9.19				473.64				340.33					
95. Laundry, ice, miscellaneous expenses, etc.							42.82				[9] 1,137.01					
96. Total				$258.58				$3,861.36				$12,864.38				$3,207.69
Barges (amounts chargeable to dredge).																
97. Ordinary repairs to barges							654.05									
98. Miscellaneous expenses							722.52	1,376.57			2,133.07					
99. Total field cost				$17,131.55				$46,429.67				$71,863.06				$15,382.77
100. Total field cost per cubic yard (cents).	$7.95				10.542				1.972				5.4.			

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Geyser.*	*Guadalupe.*	*Gulfport.*	
Extra expenses.				
101. Office expenses, superintendence, surveys, etc.	$683.86	$1,718.63	$6,318.19	$392.79
102. Extraordinary repairs to dredge:				
(*a*) Hull	....	1,819.24	990.18	....
(*b*) Machinery (exclusive of main dredging pump).	....	2,067.85	1.116.72	....
103. Extraordinary repairs to towboats and launches.	....	....	1,862.28	....
104. Extraordinary repairs to barges	40.40	123.80 5,729.52	.... 10.287.37	....
105. Total	$17,855.81	$52,159.19	$82,150.43	$15,775.56
106. Gross cost per cubic yard (cents)	8.29	11.843	2.254	5.5.
MISCELLANEOUS.				
107. Fuel consumed by dredge, tons or barrels.	841.20 short tons	3,527½ barrels of 42 gallons	4,475.55 short tons	891.37 short tons.
108. Fuel consumed by auxiliary plant, tons or barrels.			299 barrels and 545 short tons	86.3 short tons coal, 41 barrels gasoline.
109. Total cost of all fuel	$3,841.76 ($4.567 per ton)	$7,844.70	$13,201.84	$5,830.54.
110. Total water purchased (gallons)		1,599,371	495,250	
111. Cost of water per 1,000 gallons		$0.8289	Flat rate	
112. Linear feet of pipe line built during year and cost per linear foot.	None	3.300	None	None.
113. Average increase of depth of channel cut over.	4.3 feet	(²)	5.2 feet, Gulfport; 7 feet, Mobile; 3.6 feet, East Pearl River; 14 feet, Town Point.	2 feet 5 inches.
114. Maximum dredging depth	21 feet	15 feet	45 feet	45 feet
115. Number of shifts worked per day	2	2	3	3.

Remarks.

[1] WORK PERFORMED.

48	Brazos River to Matagorda Bay.	West Galveston Bay.	Anahuac Channel.	Double Bayou.	Inland waterway, Aransas Pass to Pass Cavallo.	Dickinson Bayou.	Mouth of Brazos River.
49	4	3½	5	2	3	3½	3½
50	7	7	7	7	7	7	7
51	Sand and mud.	Sand	Sand, mud, and clay.	Sand, mud, and clay.	Mud and shell.	Sand, shell, and mud.	Sand and rock.
52							
53	7,977	4,900	156,019	48,926	118,514	59,111	44,962
54	7,977	4,900	156,019	48,926	118,514	59,111	44,962

[2] Brazos River to Matagorda Bay, 3 feet; West Galveston Bay, 3 feet 6 inches; Dickinson Bayou, 3 feet 6 inches; mouth of Brazos River, 3 feet 6 inches; Anahuac Channel, 2 feet; Double Bayou, 5 feet; inland waterway, Aransas Pass to Pass Cavallo, 4 feet.

Dredge worked only 2 shifts of 8 hours each, or a total of 16 hours per day.

Dredge was laid up and out of commission Aug. 15 to Oct. 18, 1917, inclusive. Extraordinary repairs were started Oct. 19 and completed Nov. 19, 1917.

Remarks.

[1] Mobile Harbor, Ala., Gulfport Harbor, Miss., East Pearl River, Miss., Pensacola, Fla.

[2] Mobile Harbor, 24.7 feet; Gulfport Harbor, 19.4 feet; East Pearl River, 8 feet; Pensacola, Fla., 13 feet.

[3] Mobile Harbor, 31.7 feet; Gulfport Harbor, 24.6 feet; East Pearl River, 11.6 feet; Pensacola, Fla., 17 feet.

[4] 1,807,916.9, Gulfport; 1,625,173.9, Mobile; 156,407.7 East Pearl River; 54,444, Town Point.

[5] 1,973,072.5 Gulfport; 1,807,979, Mobile; 202,521.8, East Pearl River; 54,444, Town Point.

[6] 912 hours of this time was due to dredge being out of commission due to lack of funds.

[7] Of the total coal shown, 171.25 tons, valued at $460.32, was furnished by the Aeronautic Station, Pensacola, Fla.

[8] Of the 122 sleeves purchased and 37 received from dredges Pascagoula and Wahalak, 92 were worn out after a total of 100,571.9 hours; 20 were worn out by storm after a total of 20,219.5 hours; 26 were used 21,357.5 hours and are still in service; 21 were not connected and are on hand.

[9] Of this amount $1,094.54 was charged by steamer Chickasaw and launch Dauphin for towing.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Hampton.*	*Harrod, B. M.*	*Hecla.*	*Houston Sam.*
1. District	Norfolk, Va	St. Louis, Mo., Mississippi River Commission.	Rock Island, Ill	Galveston.
2. When built	1902	1907	1900-1901	1915.
3. Where built	Richmond, Va	Grafton, Ill	Fountain City, Wis	Galveston, Tex.
4. Builder	Not known	Springfield Boiler & Manufacturing Co.	United States	Bowers Southern Dredging Co.
5. Time to build	do	27 months	About 1 year	1 year.
6. Material of hull	Wood	Iron and steel	Wood	Wood.
7. Contract cost of dredge	$4,800	$238,998.17	$27,084 (no contract)	$159,972.50.
8. (*a*) Cost of outfit. (*b*) Cost of pipe line	(*a*) Included with dredge; (*b*) $750.	(*a*) $3,000	(*a*) included above; (*b*) $4,262.16	
9. Length	60 feet	210 feet	120 feet	148 feet.
10. Beam	23 feet	44 feet	26 feet	38 feet.
11. Depth	6 feet	8 feet 6 inches	5 feet	12 feet.
12. Draft:				
(*a*) Forward	3 feet 10 inches	6 feet 2½ inches	2.6 feet	7 feet 1 inch.
(*b*) Aft	2 feet 10 inches	6 feet 6 inches	1.85 feet	6 feet 3 inches.
13. Displacement (long tons)	91	1,270	194	981 tons.
14. Number of crew	10	47	19 men	57.
15. Number, size, and type of propelling engines.	None	Two 20 by 40 by 30 inches cross-compound condensing geared to paddlewheel.	None	None.
16. Number, size, and type of pumping engines.	1 vertical non-condensing, 12 by 12 inch stroke.	Two 20 and 34 by 24 inches horizontal tandem compound condensing.	One 14 and 24 by 15 inches cross-compound non-condensing.	One 14 and 22½ by 20 inches vertical triple expansion.
17. Cutter engines:				
(*a*) Diameter of cylinders				12 inches.
(*b*) Stroke				14 inches.
18. Hauling engines:				
(*a*) Diameter of cylinders	6 inches	7 inches	4½ inches	10 inches.
(*b*) Stroke	9 inches	do	6 inches	12 inches.
19. Boilers:				
(*a*) Number and type	1 horizontal return tubular	99 Mississippi River, cylindrical, flue.	Two Dryback Scotch marine	2 Babcock & Wilcox water tube.
(*b*) Length	13.5 feet	28 feet	15 feet 6 inches	13 feet 8 inches.
(*c*) Diameter	54 inches	47 inches	84 inches	8 feet 8 inches.
(*d*) Heating surface (total)	1042.8 square feet	5,634 square feet	1,036 square feet	4,390 square feet.
(*e*) Grate surface (total)	20.96 square feet	210 square feet	49 square feet	None, oil burner.
20. Discharge pipe in use (average number of feet).	300 feet	500	600 feet	950 feet.
21. Diameter of discharge pipe	12 inches	36 inches	15 inches	20 inches.
22. Pontoons:				
(*a*) Number and material of those in use (average).	10, wood	10, steel	12, wood hull, concrete deck	22 pairs, steel.
(*b*) Dimensions	One 10 by 7 by 2 feet, seven 10 by 6 by 2 feet	28 feet diameter by 2 feet 7 inches rim, 5 feet middle.	50 feet by 14 feet by 1 foot 4 inches	40 diameter, 20 feet long

23. Revolutions per minute of propelling engines.	None	60, geared down 5 to 1	None	None.	
24. Revolutions per minute of pumping engines.		132	170	150.	
25. Type of agitator or cutter head	Jet	Water-jet agitator		Open rotary.	
26. Diameter of cutter	None			6 feet 6 inches.	
27. Diameter of cutter shaft	do.			8 inches.	
28. Type of suction head	12 inch pipe; circular	Upstream and downstream	Plain square	Open.	
29. Revolutions per minute of cutter head				12 to 14.	
30. Average boiler pressure (gauge)		129 pounds	132 pounds	200 pounds per square inch.	
31. Kind of coal used		Bituminous, pea and slack	Bituminous lump	Crude oil.	
32. Average gauge pressure in discharge pipe.		12 pounds	15 pounds	40 pounds.	
33. Average vacuum in suction pipe		15 inches	21 inches of mercury	16 inches.	
ATTENDANT PLANT.					
Towboat.					
34. Name of tug attached to dredge				E. M. Hartrick.	
35. Number of crew				4.	
36. Displacement				42 tons.	
37. Draft:					
(*a*) Forward				4 feet.	
(*b*) Aft				5 feet 9 inches.	
Launches.					
38. Name				Lavaca.	
39. Length				26 feet	
40. Beam				7 feet.	
41. Depth				3 feet 3 inches.	
42. Draft				31 inches.	
43. Displacement				4 tons.	
Barges.					
44. Identifying numbers of barges in use			No. 358 and No. 487	1 No. 8.	
45. Usage			Coal	Oil and water.	
46. Displacement, light (each			50 long tons	154.	
47. Capacity of barges (each)			130 long tons	250.	
WORK PERFORMED.				Houston ship channel.	Galveston channel.
48. Location of dredging	No work done in 1917	Mississippi river below Cairo, Ill. (see remarks).	Milan section, Illinois, and Mississippi Canal & Moline Lock.		
49. Average depth before dredging		See remarks	−1.7 to −2.5	23 feet	29 feet.
50. Average depth after dredging		do.	−4.5 to −5.9	27½ feet	33 feet.
51. Character of material dredged		Sand, gravel and mud	Sand, gravel, mud, and rock	Clay, sand, mud, and shell.	Sand and mud.
52. Rate of advance per hour (in feet, straight ahead).		218	9.31		
53. Amount dredged during the year		545,512 cubic yards	61,313 cubic yards	3,419,474 cubic yards.	369,710 cubic yards.
54. Total amount dredged by this dredge at this locality.			do.	do.	Do.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Hampton.*			*Harrod, B. M.*			*Hecla.*			*Houston Sam.*		
WORK PERFORMED—contined.												
55. Average amount dredged:												
(a) Per hour (pumping)				1,664 cubic yards			119.47 cubic yards			944,266 cubic yards.		
(b) Per day				21,820 cubic yards			747.7 cubic yards			15,920,941 cubic yards.		
56. Maximum amount dredged in one month.				255,156 cubic yards			25,047 cubic yards			181,600 cubic yards.		
57. Total number of days upon which any dredging was done.				25			82			238.		
58. Average number of working hours per working day.				15 hours 50 minutes			8 hours 48 minutes			19 hours 33 minutes.		
59. Maximum number of working hours per working day.				24			16			24.		
DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping				327	55	3.74	513	12	5.86	4,012	5	45.80
(b) Handling pipe line							54	7	.62	296	20	3.38
(c) Handling swinging wires (cleaning suction.				12	40	.14	39	2	.44	300	35	3.43
(d) Going to and from wharf or anchorage.							130	5	1.48			
(e) Placing dredge				51	30	.59				50	35	.58
(f) Waiting for vessels to pass				4		.14	3	5	.04	2	20	.02
61. Time lost from work:												
(a) Changing location of plant				306	15	3.48	45	7	.52	321	25	3.67
(b) Bad weather				21	45	.25				464	40	5.31
(c) Washing boilers, and ordinary repairs.				504	40	5.76	30	13	.34	428	25	4.89
(d) Extraordinary repairs										542		6.19
(e) Other causes				7,520	15	85.85	7,449	9	85.04	937	35	10.70
(f) Sundays and holidays				12		.14	496		5.66	1,404		16.03
62. Total hours in year	8,760		100.00	8,760		100.00	8,760		100.00	8,760		100.00
63. Total time at work				396	5	4.52	739	31	8.44	4,661	55	53.22
64. Total time lost from work				8,363	55	95.48	8,020	29	91.56	4,098	5	46.78

COST OF WORK.								
Dredge.								
65. Pay rolls	...		$11,425.49		$3,630.97		$33,707.84	
66. Fuel for boilers	...		6,195.56		2,274.84		32,073.97	
67. Coal for galley	...		15.68		...		491.00	
68. Water	...		...		...		223.96	
69. Supplies, subsistence	...		3,853.12		736.44		10,668.15	
70. Supplies, engine room	...		273.57		121.88		3,210.96	
71. Other supplies	...		248.05		268.05		1,579.03	
72. Renewals or additions to outfit	...		...		378.39		[1] 14,162.28	
73. Ordinary repairs:								
(a) Hull	...		4,412.76		...		459.51	
(b) Machinery (exclusive of main dredging pump.	...		4,838.07		81.08		998.10	
74. Laundry, ice, miscellaneous expenses	...		8.20		102.19		[2] 8,245.39	
75 Total	...			$31,270.50		$7,593.84		$105,820.19
Main dredging pump.								
76. Diameter of runner	...		90 inches		39 inches		96 inches.	
77. Volute (lined or unlined)	...		Lined		Unlined		Unlined.	

	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:														
(a) Volute	...	...	...	...	...	...	...	...	...		...	...	...	
(b) Runner	...	...	...	...	...	...	...	...	...		...	...	...	
(c) Volute liners	...	...	...	...	...	...	...	...	...		...	...	...	
(d) Runner liners	...	...	...	...	...	...	...	...	...		...	...	$296.67	
(e) Head and back liners	...	...	...	...	...	...	...	...	...		...	...	296.66	
79. Miscellaneous repairs	...	...	...	...	...	...	...	...	...		...	...	239.30	
80. Total	...	...	...	...	...	...	...	...	...		...	...	...	$832.63
Pipe lines.														
81. Renewals:													2,443.23	
(a) Rubber sleeves	...	...	...	...	...	...	16	...	$578.40		...	...	...	
(b) Pipe	...	...	...	...	...	...	...	...	135.00		...	...	...	
(c) Pontoons	...	...	...	...	...	...	...	...	...		...	...	...	
(d) Outfit	...	...	...	...	...	...	...	...	...		...	...	391.40	
82. Repairs	...	...	...	...	...	...	...	...	...		...	...	73.17	
83. Miscellaneous	...	...	...	...	...	...	...	...	...		...	...		
84. Total	...	...	...	...	...	...	...	...	...	$713.40	...	...	...	$2,907.80

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Hampton.*		*Harrod, B. M.*		*Hecla.*		*Houston Sam.*	
COST OF WORK—continued.								
Towboats and launches.								
85. Pay rolls	....		....		$100.62		$5,624.27	
86. Fuel for boilers	....		....		....		3,528.70	
87. Coal for galley	....		....		....		....	
88. Water	....		....		....		11.10	
89. Supplies, subsistence	....		....		....		1,505.21	
90. Supplies, engine room	....		....		....		289.59	
91. Launch supplies	....		....		....		....	
92. Other supplies	....		....		....		47.76	
93. Renewals of or additions to outfit	....		....		....		523.75	
94. Ordinary repairs	....		....		5.55		1,636.07	
95 Laundry, ice, miscellaneous expenses, etc.	....		....		....		248.63	
96. Total		....		....		$106.17		$13,415.08
Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges	....		....		8.76		870.67	
98. Miscellaneous expenses	....		....		....		....	870.67
99. Total field cost		....		$31,270.50		$8,422.17		$123,846.37
100. Total field cost per cubic yard (cents).	....		5.79		13.78		3.264 plus.	
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	....		$9,205.39		300.70		7,666.98	
102. Extraordinary repairs to dredge:								
(*a*) Hull	....		1,148.48		....		2,217.08	
(*b*) Machinery (exclusive of main dredging pump).	....		11,880.38		....		10,103.28	
103. Extraordinary repairs to towboats and launches.	....		....		....		989.42	
104. Extraordinary repairs to barges	....		....		....		2,387.51	
105. Total		....						23,364.23
106. Gross cost per cubic yard (cents)	....	....	9.81	$53,504.75	14.27	$8,722.87	3.885 plus	$147,210.60

MISCELLANEOUS.				
107. Fuel consumed by dredge, tons or barrels.		2,293	574.75 short tons	23,162.11 barrels of 42 gallons each.
108. Fuel consumed by auxiliary plant, tons or barrels.				
109. Total cost of all fuel		$6,211.24	$2,142.67—$3.728 per ton	$35,602.67.
110. Total water purchased (gallons)				1,705,345.
111. Cost of water per 1,000 gallons				$0.13783 plus.
112. Linear feet of pipe line built during year and cost per linear foot.			None	No record.
113. Average increase of depth of channel cut over.		2½ feet	3.3 feet	Houston Ship Channel, 4½ feet; Galveston Channel, 4 feet.
114. Maximum dredging depth			21 feet	45 feet.
115. Number of shifts worked per day			2	3.

Remarks.

Dredging at the following places:

Locality.	Miles below Cairo.	Average depth, feet.	
		Before dredging.	After dredging.
Gayoso crossing	104	8	10½
Point Pleasant	80	10	11½
Morrisson	70	10	13

Remarks.

[1] Includes cost of new pump (not installed), amount $6,100.

[2] Includes $7,764 (Fort Point charges).

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Humphreys, Charles.*	*Indiana.*	*Iota.*	*Kappa.*
1. District	Mobile, Ala	First, Cincinnati, Ohio	St. Louis, Mo., Mississippi River Commission.	St. Louis, Mo., Mississippi River Commission.
2. When built	1907-8	1908	1900	1901.
3. Where built	Mobile, Ala	Hull, Jeffersonville, Ind.; machinery, Baltimore, Md.	Grafton, Ill	Grafton, Ill.
4. Builder	United States	Hull, Howard Shipyards; Ellicott Machinery Works.	Springfield Boiler & Manufacturing Co.	Bucyrus Steam Shovel & Dredge Co.
5. Time to build	About 1 year	2½ years	About 2 years	About 25 months.
6. Material of hull	Wood	Steel	Steel	Steel.
7. Contract cost of dredge	$46,560.97	(1)	$100,479.79	$122,400.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) Included in contract cost	(*a*) 6,117.13; (*b*) 16,678.30	(*a*) $3,000 (approximate)	(*b*) $12,200.
9. Length	129 feet 9 inches	125 feet	192 feet	192 feet.
10. Beam	32 feet	34 feet	44 feet	44 feet.
11. Depth	8 feet 9 inches	6 feet 10 inches	7 feet	7 feet.
12. Draft:				
(*a*) Forward	3 feet	3 feet 8 inches	3 feet 9 inches	3 feet 10½ inches.
(*b*) Aft	2 feet 6 inches	3 feet 8 inches	4 feet 9 inches	5 feet.
13. Displacement (long tons)	234	417.5	800	834.
14. Number of crew	31	29 men; double crew, 8 hours each.	47	43.
15. Number, size, and type of propelling engines.	None	Has none	Two 22-inch cylinder, 6-foot stroke, Mississippi River side-wheel.	Two 22-inch cylinder, 7-foot stroke, Mississippi River side-wheel.
16. Number, size, and type of pumping engines.	One vertical marine compound engine, 150 horsepower, direct connected to pump.	12 and 22 by 14 inches, horizontal compound; develops 250 horsepower.	Two 16 and 26 by 20 inches, horizontal tandem compound, condensing.	Two 15 and 30 by 24 inches, horizontal tandem compound, condensing.
17. Cutter engines:				
(*a*) Diameter of cylinders	9 inches	7 inches		None.
(*b*) Stroke	do	10 inches		
18. Hauling engines:				
(*a*) Diameter of cylinders	8 inches	11 inches	7 inches	7 inches.
(*b*) Stroke	12 inches	14 inches	do	Do.
19. Boilers:				
(*a*) Number and type	2, Western Steamboat type, 5 flues, 11 inches diameter.	1 Worthington water tube marine, 270 horsepower.	7, Mississippi River, cylindrical, flue.	7, Mississippi River, cylindrical, flue.
(*b*) Length	28 feet	13 feet 1 inch with tubes 11 feet 3½ inches long.	30 feet	30 feet.
(*c*) Diameter	47 inches		44 inches	44 inches.
(*d*) Heating surface (total)	1,264.6 square feet	2,432 square feet	3,885 square feet	3,948 square feet.
(*e*) Grate surface (total)	41.6 square feet	54.83 square feet	157.5 square feet	157.5 square feet.
20. Discharge pipe in use (average number of feet).	450 feet	320 feet		
21. Diameter of discharge pipe	12 inches	17 inches outside diameter	32$\frac{11}{16}$ inches	31⅞ inches.

22. Pontoons:				
(a) Number and material of those in use (average).	22, wood	5, steel		
(b) Dimensions	Length, 10 feet; beam, 6 feet; depth, 2 feet.	40 feet long, 12-foot beam, 3 feet 2 inches depth.		
23. Revolutions per minute of propelling engines.	None			
24. Revolutions per minute of pumping engines.	202	256	160	
25. Type of agitator or cutter head	Hemispherical rotary	Steel, spiral	Water-jet agitator	Water-jet agitator.
26. Diameter of cutter	6 feet 5 inches	5 feet		
27. Diameter of cutter shaft	$7\frac{1}{16}$ inches	do		
28. Type of suction head	Open flange, opening inside cutter head.	Elliptical opening 13 by 19 inches.	Upstream with water jet	Upstream with water jet.
29. Revolutions per minute of cutter head.	8	15 to 20		
30. Average boiler pressure (gauge)	125 pounds per square inch	175 pounds	134 pounds	
31. Kind of coal used	Bituminous, run of mine	Bituminous, run of mine		
32. Average gauge pressure in discharge pipe.	14 pounds	10 to 20	14 pounds	
33. Average vacuum in suction pipe	9.7 inches	18 to 24 inches	10 inches	
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge		M. D. Wayman[2]		Mercury.
35. Number of crew		9		6.
36. Displacement		242.09 long tons		83.
37. Draft:				
(a) Forward		32 inches		3 feet 1 inch.
(b) Aft		28 inches		2 feet 8 inches.
Launches.				
38. Name		Nell		
39. Length		25 feet		
40. Beam		5.5 feet		
41. Depth		2 feet 2.5 inches		
42. Draft		2 feet		
43. Displacement		1.5 tons		
Barges.				
44. Identifying numbers of barges in use	2	Nos. 5-6, 6-7		1,004.
45. Usage	Fuel barges	5-6 fuel; 6-7 storage		Pontoon, for discharge pipe.
46. Displacement, light (each)	51 and 94 long tons	63 tons		100 tons.
47. Capacity of barges (each)	200 and 300 short tons	206		500 tons.
WORK PERFORMED.				
48. Location of dredging	Black Warrior River	Lower Ohio River	Mississippi River below Cairo, Ill. (see remarks).	Memphis Harbor.
49. Average depth before dredging	6.1 feet	3.2 feet	See remarks	5 to 6 feet.
50. Average depth after dredging	8.8 feet	8.1 feet	do	8 to 12 feet.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Humphreys, Charles.*	*Indiana.*	*Iota.*	*Kappa.*
WORK PERFORMED—continued.				
51. Character of material dredged	Sand and gravel	Sand and gravel	Sand, gravel, and mud	Mud and sand.
52. Rate of advance per hour (in feet straight ahead).	7.4 feet	22.21	112	83.35.
53. Amount dredged during the year	244,746 cubic yards	511,459 cubic yards	647,962 cubic yards	531,450 cubic yards.
54. Total amount dredged by this dredge at this locality.	do	(1)		
55. Average amount dredged:				
(a) Per hour (pumping)	84.5 cubic yards	357.35	536 cubic yards	432.52 cubic yards.
(b) Per day	1,377 cubic yards	4,649.6 cubic yards	7,043 cubic yards	6,326.82 cubic yards.
56. Maximum amount dredged in one month.	42,574 cubic yards	163,296 cubic yards	174,318 cubic yards	182,032.67 cubic yards.
57. Total number of days upon which any dredging was done.	176	110	92	84.
58. Average number of working hours per working day.	24, 3 shifts of 8 hours each	11.19	13 hours 10 minutes	18.18.
59. Maximum number of working hours per working day.	24	18.00	24	24.

DISTRIBUTION OF TIME.	Humphreys, Charles. Hours.	Minutes.	Percentage.	Indiana. Hours.	Minutes.	Percentage.	Iota. Hours.	Minutes.	Percentage.	Kappa. Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	2,884		32.92	1,431	15	16.34	1,208	5	13.79	1,254	35	14.32
(b) Handling pipe line	82		.94	43		.49				1	55	.02
(c) Handling swinging wires (cleaning suction).	34		.39	63	15	.72	86	10	.98	122	40	1.40
(d) Going to and from wharf or anchorage.											15	
(e) Placing dredge	37		.42	22	30	.26	129	35	1.48	141	15	1.61
(f) Waiting for vessels to pass	46		53	14	30	.17	30	15	.35	26		.30
61. Time lost from work:												
(a) Changing location of plant	299		3.41	271	15	3.1	141	20	1.61	15	25	.18
(b) Bad weather	222		2.53	647	15	7.39	39	15	.45	1	45	.02
(c) Washing boilers and ordinary repairs.	97		1.11	89		1.01	394		4.50	201	30	2.30
(d) Extraordinary repairs	2,959		33.78							2	30	.03
(e) Other causes	684		7.81	5,419	30	61.86	6,267	20	71.54	6,512	10	74.34
(f) Sundays and holidays	1,416		16.16	758	30	8.66	464		5.30	480		5.48
62. Total hours in year	8,700		100.00	8,760		100.00	8,760		100.00	8,760		100.00
63. Total time at work	3,083			1,574	30	18.00	1,454	5	16.60	1,546	40	17.65
64. Total time lost from work	5,677			7,185	30	82.00	7,305	55	83.40	7,213	20	82.35

COST OF WORK.																
Dredge.																
65. Pay rolls			$10,723.76				$16,183.90				$17,597.88				$8,263.11	
66. Fuel for boilers			5,773.75				9,351.30				18,810.16				13,250.70	
67. Coal for galley			43.80								14.70					
68. Water																
69. Supplies, subsistence			3,399.62				4,154.20				6,580.89				3,609.43	
70. Supplies, engine room			408.17				735.75				529.89				453.00	
71. Other supplies			373.64				1,306.43				490.47				175.00	
72. Renewals or additions to outfit			301.02				1,070.45									
73. Ordinary repairs:																
(a) Hull			36.88				37.87				1,744.73				3,460.21	
(b) Machinery (exclusive of main dredging pump).			575.33				311.76				2,231.33				3,407.79	
74. Laundry, ice, miscellaneous expenses.			178.40				477.16				234.06				160.00	
75. Total				$21,814.37				$33,628.82				$48,234.11				$
Main dredging pump.																
76. Diameter of runner	56 inches				50 inches				75 inches				84 inches.			
77. Volute (lined or unlined)	Lined				Unlined				Unlined				Unlined.			
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(a) Volute																
(b) Runner	1	2,065	$289.00													
(c) Volute liners	1	2,065	193.50													
(d) Runner liners	1	2,065	59.63													
(e) Head and back liners	1	1,239	20.00													
79. Miscellaneous repairs			7.50				$42.70				$190.62				$253.95	
80. Total				$569.63				$42.70				$190.62				$253.95
Pipe line.																
81. Renewals:																
(a) Rubber sleeves	10	21,824	210.00													
(b) Pipe							545.96									
(c) Pontoons																
(d) Outfit																
82. Repairs							199.00								569.77	
83. Miscellaneous							84.90				37.49					
84. Total				$210.00				$829.86				$37.49				$569.77

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Humphreys, Charles.*		*Indiana.*		*Iota.*		*Kappa.*	
COST OF WORK—continued.								
Towboats and launches.								
85. Pay rolls	....		[2] $7,567.09		....		....	
86. Fuel for boilers	....		....		....		....	
87. Coal for galley	....		....		....		....	
88. Water	....		....		....		....	
89. Supplies, subsistence	....		....		....		....	
90. Supplies, engine room	....		....		....		....	
91. Launch supplies	....		....		....		....	
92. Other supplies	....		....		....		....	
93. Renewals of or additions to outfit	....		....		....		....	
94. Ordinary repairs	....		....		....		....	
95. Laundry, ice, miscellaneous expenses, etc.	....		....		....		....	
96. Total		....		$7,567.09		....		....
Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges	$20.42		....		....		....	
98. Miscellaneous expenses	....	20.42	....		....		....	
99. Total field cost		$22,614.42		42,068.47		$48,462.22		$33,602.96
100. Total field cost per cubic yard (cents).	9.24		8.2252+		7.48		6.32.	
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	2,233.27		1,023.28		7,450.00		771.45	
102. Extraordinary repairs to dredge:								
(*a*) Hull	546.44		....		....		....	
(*b*) Machinery (exclusive of main dredging pump).	2,869.63		....		....		....	
103. Extraordinary repairs to towboats and launches.	....		....		....		....	
104. Extraordinary repairs to barges	....	5,649.34	....		....		....	
105. Total		$28,263.76		$43,091.75		$55,912.22		$34,374.41
106. Gross cost per cubic yard (cents)	11.55		8.4252+		8.63		6.47.	
MISCELLANEOUS.								
107. Fuel consumed by dredge, tons or barrels.	2,253 short tons		2,074.11		....			
108. Fuel consumed by auxiliary plant, tons or barrels.	....		467.14		....			
109. Total cost of all fuel	$5,817.55		$9,351.30		$18,824.88			
110. Total water purchased (gallons)	....		....		....			
111. Cost of water per 1,000 gallons	....		....		....			

112. Linear feet of pipe line built during year and cost per linear foot.			
113. Average increase of depth of channel cut over.	2.7 feet	4.9	4 feet
114. Maximum dredging depth		18 feet	
115. Number of shifts worked per day		2	

Remarks.

This dredge operated on Black Warrior River from Twenty-one Mile Bar, Mile 340, to Kaintuck Chute, Mile 250, dredging bars, locks, and approaches.

Remarks.

[1] Hull and upper works	$27,886.94
Machinery	59,925.00
Pontoons and pipe line	16,678.30
Plumbing, heating, lighting and refrigerating	4,722.95
	109,213.19

[2] Towboat M. D. Wayman, tender for U. S. dredge Indiana, hired at the rate of $71.50 per day, covering boat, crew, and all expenses, except fuel, which was furnished by the United States. From fuel purchased for the dredge there should be deducted 467.14 tons coal at $3.367.9+ per ton=$1,409.21.

[3] Location.	Miles below Pittsburgh	Excavation, cubic yards.
Nine Mile Bar	456.5	48,765
Flint Island	683.0	15,115
Henderson Bar	796.5	67,049
Raleigh Crossing	843.0	37,083
Greens Crossing	854.0	42,141
Cave-in-Rock Bar	869.0	31,346
Balls Bar	871.0	46,131
Upper Cottonwood Bar	913.0	41,661
Lower Cottonwood Bar	916.0	49,980
Little Chain	933.0	18,287
Mosleys Crossing	941.0	53,368
French Idland	757.0	39,995
Mussel Shoal	721.0	20,538
		511,459

Miles traveled by U. S. dredge Indiana, 810.

Remarks.

Dredging at the following places:

Locality.	Miles below Cairo.	Average depth, feet.	
		Before dredging.	After dredging.
Foot Island 30	161	9½	12
Drivers	169	10½	12½
Memphis Harbor	230	7-9	12-14

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*McGregor, Robert.*		*Macon.*	*Mallery, Maj. J. C.*
1. District	Little Rock, Ark	Kansas City, Mo	Savannah, Ga	Jacksonville, Fla.
2. When built	1912–1914	1912–1914	1911	1913.
3. Where built	Dubuque, Iowa	Dubuque, Iowa	Jacksonville, Fla	Baltimore, Md.
4. Builder	Dubuque Boat & Boiler Works	Dubuque Boat & Boiler Works	Merrill-Stevens Co	Ellicott Machine Corporation.
5. Time to build	2 years 3½ months	2 years 3½ months	6 months	About 1 year.
6. Material of hull	Steel	Steel	Steel	Steel.
7. Contract cost of dredge	$160,174.24	$182,964.37[1]	$17,875	$74,000 and United States dredge Jacksonville in exchange.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) $4,472.92; (*b*) $22,847.63	(*a*) $4,472.92	(*a*) $2,572.90; (*b*) included in (*a*)	(*a*) $9,781.42; (*b*) $13,976.66.
9. Length	206 feet 9 inches over all	206 feet 9 inches over all	74 feet	130 feet.
10. Beam	44 feet 4 inches	44 feet 4 inches	28 feet	32 feet.
11. Depth	7 feet	7 feet	4 feet 6 inches	9 feet.
12. Draft:				
(*a*) Forward	3 feet 2 inches	4 feet	2 feet 6 inches	6.5 feet.
(*b*) Aft	3 feet 3 inches	do	2 feet 4 inches	6.2 feet.
13. Displacement (long tons)	700	700	120	665.59.
14. Number of crew	42	52	13	43.
15. Number, size, and type of propelling engines.	Two 24 by 48 inch stroke, Eaton & Gillette.	Two 24 by 48 inch stroke, Eaton & Gillette.		
16. Number, size, and type of pumping engines.	One 15 and 22½ and 36 by 18 inch condensing.	One 15 and 22½ and 36 by 36 inch condensing.	One 2 cylinder 8 by 8 vertical opposite crank directly connected to 10-inch pump.	One 14 by 28 by 18 inch compound.
17. Cutter engines:				
(*a*) Diameter of cylinders	No cutter engine		5 inches	10½ inches.
(*b*) Stroke	do		8 inches	10 inches.
18. Hauling engines:				
(*a*) Diameter of cylinders	7 inches	7 inches	7 inches	7 inches.
(*b*) Stroke	8 inches	8 inches	10 inches	10 inches.
19. Boilers:				
(*a*) Number and type	3 Lyons combination water and fire tube.	3 Lyons combination water and fire tube.	1 horizontal return tubular, under-fire.	2 Heine watertube, 7 feet 3 inches by 13 feet 8 inches by 15½ inches each.
(*b*) Length	20 feet	20 feet	14.1 feet	15 feet 4 inches.
(*c*) Diameter	66 inches	66 inches	5 feet 4 inches	3 feet 6 inches (steam drum).
(*d*) Heating surface (total)	5,184 square feet	5,184 square feet	1,110 square feet	3,000 square feet.
(*e*) Grate surface (total)	1,355 square feet	135 square feet	30 square feet	79.1 square feet.
20. Discharge pipe in use (average number of feet).	250	330	400	1,160.
21. Diameter of discharge pipe	24 inches	24 inches	10 inches	18 inches.
22. Pontoons:				
(*a*) Number and material of those in use (average).	5 steel	6 steel	12 wooden pontoons	Wood, average 4 pontoons to 100 feet of pipe.
(*b*) Dimensions	47 feet 6 inches by 12 feet by 3 feet.	47 feet 6 inches by 12 feet by 3 feet.	16 by 10 feet by 16 inches	20 by 8 by 3.5 feet deep.

23. Revolutions per minute of propelling engines.	16 (as operated)	35		No propelling engine.
24. Revolutions per minute of pumping engines.	165	165	375	190.
25. Type of agitator or cutter head	Water jet; no cutter head	Water jet; no cutter head	Revolving tooth and blade	Revolving spiral.
26. Diameter of cutter	No cutter head		3 feet	5 feet 8 inches.
27. Diameter of cutter shaft	do		3½ inches	7 to 7½ inches.
28. Type of suction head	Dust pan	Dust pan	Oblong	Round with hood.
29. Revolutions per minute of cutter head.	No cutter head	No cutter head	12	10.
30. Average boiler pressure (gauge)	160 pounds	165 pounds	100 pounds	147 pounds.
31. Kind of coal used	Mine run, Arkansas semi-anthracite and Kentucky bituminous.	Bituminous	Bituminous coal and wood	Bituminous.
32. Average gauge pressure in discharge pipe.	7 pounds	4 pounds	15 pounds	23 pounds.
33. Average vacuum in suction pipe	15 inches	16 inches	16 inches	8 inches.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge	J. C. ATLEE (chartered plant)[1]	Leavenworth[2]		Frank.
35. Number of crew	6	4		5.
36. Displacement	Not known			75 tons, approximate.
37. Draft:				
(*a*) Forward	do			5 feet.
(*b*) Aft	do			8 feet.
Launches				
38. Name			No name, temporary outfit	Margie D.
39. Length			26 feet	29 feet 9 inches.
40. Beam			7 feet	9 feet.
41. Depth			2 feet 8 inches	3 feet 5 inches.
42. Draft			2 feet 2 inches	3 feet.
43. Displacement			2.9 tons	0.75 tons, approximate.
Barges.				
44. Identifying numbers of barges in use	B-1, B-2, B-3 and B-4[2]	B3 14, 612, 614	1	U. S. 2. 3. 4. M-5.
45. Usage	Fuel supply	Fuel	Coal and water	*Fuel.* *Water.* *Fuel.* *Derrick.*
46. Displacement, light (each)	70 long tons	50 long tons	10 tons	50.5 50.5 50.5 20
47. Capacity of barges (each)	180 long tons, maximum	200 tons	40 tons	80 80 80 30

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*McGregor, Robert.*						*Macon.*			*Mallery, Maj. J. C.*		
WORK PERFORMED.												
48. Location of dredging	Arkansas River			Missouri River, Kansas City to mouth.			Ocmulgee River			St. Johns River, Fla., Jackson- to ocean.		
49. Average depth before dredging	72			4 feet			1 to 3 feet			25.6 feet.		
50. Average depth after dredging	10.2 [3]			9 feet			4 to 5 feet			32 feet.		
51. Character of material dredged	Sand, 75 per cent; gravel, 15 per cent; mud, 10 per cent.			Sand, mud, and gravel			Sand and gravel			Sand and shell, some loose rock.		
52. Rate of advance per hour (in feet straight ahead).	250			218 feet			5.9 feet (pumping time)			2.2 to 13.2 feet.		
53. Amount dredged during the year	160,200 cubic yards			432,500 cubic yards			131,761 cubic yards			742,518 cubic yards.		
54. Total amount dredged by this dredge at this locality.	785,800 cubic yards			do			646,542 cubic yards			4,110,561 cubic yards.		
55. Average amount dredged:												
(a) Per hour (pumping)	1,013 cubic yards			1,065 cubic yards			107.8 cubic yards			181 cubic yards.		
(b) Per day	3,560 cubic yards			7,900 cubic yards			1,221.9 cubic yards			2,970 cubic yards.		
56. Maximum amount dredged in one month.	91,500 cubic yards			163,600 cubic yards			40,693 cubic yards			88,104 cubic yards.		
57. Total number of days upon which any dredging was done.	24			55			108			250.		
58. Average number of working hours per working day.	16			7			13 hours 3.3 minutes			19.47.		
59. Maximum number of working hours per working day.	16			15			16			23.		
DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	158			406		9.84	1,221	35	13.945	4,095	40	46.70
(b) Handling pipe line	12			82		1.99	138	35	1.582	677		7.80
(c) Handling swinging wires (cleaning suction).	40			84		2.04	44	25	.507	95	10	1.08
(d) Going to and from wharf or anchorage.	92			100		2.42						
(e) Placing dredge	1			59		1.43	2	50	.032			
(f) Waiting for vessels to pass	7			4		.10	2	30	.029			
61. Time lost from work:												
(a) Changing location of plant	251			703		17.03	80	20	.917	201	15	2.30
(b) Bad weather	20			86		2.08	305	55	3.492	166	20	1.90
(c) Washing boilers and ordinary repairs.	28			20		.48	369	30	4.218	450		5.13
(d) Extraordinary repairs				685		16.59				570		6.50
(e) Other causes	3,279			1,319		31.95	5,898	20	67.333	[1] 1,089	35	12.43
(f) Sundays and holidays	744			580		14.05	696		7.945	1,416		16.16
62. Total hours in year	(4)		100.00			100.00	8,760		100.00	8,760		100.00
63. Total time at work	310		6.7–	3,278			1,409	55	16.098	4,857	50	55.50
64 Total time lost from work	4,322		93.34	803			7,350	5	83.905	3,902	10	44.44

COST OF WORK.

Dredge.

65. Pay rolls	$9,971.13		$10,947.34		$5,353.78		$28,721.62	
66. Fuel for boilers	3,357.85		6,770.65		4,095.00		[2] 13,879.17	
67. Coal for galley	28.95				7.50		229.87	
68. Water							587.00	
69. Supplies, subsistence	3,051.62		4,278.52		1,920.29		9,093.20	
70. Supplies, engine room	299.68		175.12		577.34		707.05	
71. Other supplies	1,290.66		366.16		462.58		1,204.41	
72. Renewals or additions to outfit	127.31		972.35		429.31		5,964.58	
73. Ordinary repairs:								
(a) Hull					91.08		183.02	
(b) Machinery (exclusive of main dredging pump).	205.67		169.23		186.96		116.97	
74. Laundry, ice, miscellaneous expenses.	46.55		29.20		36.90		1,222.17	
75. Total		$18,379.42		$23,708.57		$13,160.74		$61,909.06

Main dredging pump.

76. Diameter of runner	69 inches	6 feet	30 inches	72 inches.
77. Volute (lined or unlined)	Lined	Lined	Unlined	Unlined.

	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(a) Volute																
(b) Runner																
(c) Volute liners																
(d) Runner liners													4		$599.75	
(e) Head and back liners													4		456.70	
79. Miscellaneous repairs											$42.00				327.08	
80. Total												$42.00				$1,383.53
Pipe line.																
81. Renewals:																
(a) Rubber sleeves											173.95		20		728.00	
(b) Pipe											177.37		(3)		9,846.44	
(c) Pontoons																
(d) Outfit															3,652.96	
82. Repairs							$68.96								1,980.52	
83. Miscellaneous			$4.55				6.25				166.10				121.27	
84. Total				$4.55				$75.21				$517.42				$16,329.19

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*McGregor, Robert.*				*Macon.*		*Mallery, Maj. J. C.*	
COST OF WORK—continued.								
Towboats and launches.								
85. Pay rolls	....		....		....		$1,476.83	
86. Fuel for boilers	$114.85		$655.25		$118.24		2,529.13	
87. Coal for galley	....		....		....		....	
88. Water	....		....		....		....	
89. Supplies, subsistence	....		....		....		....	
90. Supplies, engine room	....		....		....		(4)	
91. Launch supplies	....		....		....		87.30	
92. Other supplies	....		....		2.40		1.60	
93. Renewals of or additions to outfit	....		....		4.80		2,763.43	
94. Ordinary repairs	....		....		....		....	
95. Laundry, ice, miscellaneous, expenses, etc.	[5] 1,924.09		[5] 3,465.00		....		[5] 7,013.00	
96. Total		$2,038.94		$4,120.25		$125.44		$13,871.29
Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges	....		....		....		66.30	
98. Miscellaneous expenses	....	....	81.04	81.04	....	....	23.10	89.40
99. Total field cost		$20,422.91		$27,985.07		$13,845.60		$93,582.47
100. Total field cost per cubic yard (cents).	12+		6.47		10.508		12.6.	
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	3,884.68		2,140.25		1,408.17		7,512.78	
102. Extraordinary repairs to dredge:								
(a) Hull	3.60		....		69.38		4,766.69	
(b) Machinery (exclusive of main dredging pump).	97.73		78.37		3.35		5,320.13	
103. Extraordinary repairs to towboats and launches.	....		....		105.72		....	
104. Extraordinary repairs to barges	....	3,986.01	....	....	57.70	....	2,382.61	....
105. Total		$24,408.92		$30,203.69		$15,489.92		$113,564.68
106. Gross cost per cubic yard (cents)	15+		6.08		11.756		15.295.	

MISCELLANEOUS.				
107. Fuel consumed by dredge, tons	826 tons	1,666 tons	630 tons	4,577.6 short tons.
108. Fuel consumed by auxiliary plant, tons or barrels.	23.5 tons	180 tons	508 gallons gasoline; 108 gallons kerosene.	402 short tons coal, 4,422 gallons gasoline.
109. Total cost of all fuel	$3,501.65	$2 to $4.25	$4,213.24	Note 2.
110. Total water purchased (gallons)	None purchased	None	None	1,174,000.
111. Cost of water per 1,000 gallons	do			50 cents.
112. Linear feet of pipe line built during year and cost per linear foot.	None built	None	None	Note 3.
113. Average increase of depth of channel cut over.	3 feet [3]	5 feet	5.3 feet	5.6 feet.
114. Maximum dredging depth	14 feet	14 feet	15 feet	50 feet.
115. Number of shifts worked per day	2	2	1	3.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	Labor cost of work done by crew operating main dredging pump, pipe line, and barges not separable. Fuel purchased by short tons of 2,000 pounds. [1] Additional towing and survey service in connection with these operations were: Snagboat Quapaw, 15 days; hired boat J. C. Atlee, 31 days; hired boat Wolverine, 1 hour each on Jan. 6 and 8. Charter rate for Atlee included, everything except fuel. The cost to the work of the other boats in item 95, one-half to dredge Taber and one-half to dredge McGregor. [2] These barges used by both dredges McGregor and Taber. Coal was also obtained in coal company barges. [3] One day after dredging. [4] Last day for Little Rock district was July 13, 1917; after that date in charge of Kansas City office. [5] Cost of chartered towboat and towing charges.	Fuel purchased by short ton. No record of separate labor cost of work done by crew on operation of main dredging pump, pipe line, and barges. [1] Includes cost of pipe line. [2] Hired towboat; dimensions about 90 feet by 18 feet, draft about 20 inches (mean). [3] Hired boat.	Dredge laid up at Macon, Ga., from July 15 to Dec. 31, 1917.	[1] Includes 399 hours' delay on account tides too strong to operate. [2] Short tons, price f. o. b. United States barge, Jacksonville, Fla.: 2,439.89 tons, at $3.435; 361.95 tons, at $4.79; 367 tons, at $5.27; 388.9 tons, at $6.16; 303.0 tons, at $3.6433; and 414 tons, at $6.95. Coal for tender and galley at same prices. [3] 600 feet shore pipe, at $2.45 per foot; 600 feet shore pipe, at $3.45 per foot; 600 feet of pontoon pipe. [4] Subsistence furnished by dredge. [5] Amount is for hire of towboat and launches.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Mayon.*	*Miller, Col. A. M.*	*Monticello.*[1]	*Morgan.*
1. District	Rock Island, Ill	Galveston, Tex	Second Portland, Oreg	Savannah, Ga.
2. When built	1911–12	1906	1915	1907–8.
3. Where built	Keokuk, Iowa	Galveston, Tex	House and hull, St. Helens, machinery, Portland, Oreg.	Baltimore, Md.
4. Builder	United States	Powers-Southern Dredging Co.	(2)	Ellicott Machinery Co.
5. Time to build	About 1 year	6 monrhs	140 calendar days	About 7 months.
6. Material of hull	Creosoted fir, steel and concrete.	Long leaf yellow pine, copper sheathed.	Wood	Steel.
7. Contract cost of bridge	(No contract) $21,954	$102,000	$27,830	$119,676.21.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) included above; (*b*) $6,229.96.	(*a*) $10,952. 45	(*a*) $1,415.33; (*b*) $1,700 [3]	(*a*) $14,765.23; (*b*) $16,734.90.
9. Length	130 feet	138 feet 6 inches	103 feet 3 inches	134 feet 5 inches.
10. Beam	28 feet	37 feet	34 feet 6 inches	38 feet.
11. Depth	5 feet	13 feet	5 feet 10 inches	8 feet.
12. Draft:				
(*a*) Forward	36 inches	8 inches	2 feet 3 inches	4 feet 8 inches.
(*b*) Aft	42 inches	7 feet	2 feet 1 inch	5 feet 10 inches.
13. Displacement (long tons)	276	9,426	195	757.
14. Number of crew	19 men	54	11	45.
15. Number, size, and type of propelling engines.				
16. Number, size, and type of pumping engines.	One 13 and 25 by 16 inch cross compound condensing.	One 14, 22½ inches and 36 by 18 inch vertical triple expansion.	One 2-cylinders 9 by 9 inches, vertical, direct connected to 10-inch Morris Machine Works sand dredging pump.	One 12, 20 and 32 by 20 inch triple expansion.
17. Cutter engines:				
(*a*) Diameter of cylinders		13 inches		11 inches.
(*b*) Stroke		14 inches		14 inches.
18. Hauling engines:				
(*a*) Diameter of cylinders	8½ inches	10 inches	Main engines; 10 inches	11$\frac{1}{16}$ inches.
(*b*) Stroke	10 inches	12 inches	Main engines; 13 inches	12 inches.
19. Boilers:				
(*a*) Number and type	3 Mississippi River type	2 Heine water tube	1 Scotch marine	2 Scotch marine boilers.
(*b*) Length	20 feet 2½ inches	16 feet	11 feet	11 feet.
(*c*) Diameter	40½ inches	Drums, 18 by 3 feet; tubes, 15 feet ⅞ inch by 3½ inches.	90 inches	Do.
(*d*) Heating surface (total)	1,116 square feet	4,270 square feet	772 square feet	2,730 square feet.
(*e*) Grate surface (total)	48.75 square feet	108 square feet (oil furnace used).	1 oil burner; 1 furnace of 42 inches.	90 square feet.
20. Discharge pipe in use (average number of feet).	750	1,200 feet	(4)	1,000 feet.
21. Diameter of discharge pipe	20 inches	20 inches	10 inches inside diameter	20 inches.
22. Pontoons:				
(*a*) Number and material of those in use (average).	Wood, concrete decks	40 pairs steel	20, wood [4]	24, steel.
(*b*) Dimensions	50 by 14 feet by 3 feet 4 inches	3 feet 10 inches by 25 feet	10 by 6 by 2 feet	Length, 24 feet; beam, 13 feet 8 inches; depth, 24 inches.

23. Revolutions per minute of propelling engines.			Nonpropelling	
24. Revolutions per minute of pumping engines.	235	175	260	178.
25. Type of agitator or cutter head		Open rotary		Revolving blade cutter.
26. Diameter of cutter		6 feet		6 feet.
27. Diameter of cutter shaft		8 inches		8 inches.
28. Type of suction head	Plain square	Open	Rectangular	Suction pipe elongated.
29. Revolutions per minute of cutter head		10 to 12		14.
30. Average boiler pressure (gauge)	145 pounds	180 pounds per square inch	110 pounds.	180 pounds.
31. Kind of coal used	Bituminous, lump and mine run.	Crude oil	Fuel oil	Bituminous.
32. Average gauge pressure in discharge pipe.	14 pounds	27 pounds per square inch	8 pounds	25 pounds.
33. Average vacuum in suction pipe	16 inches of mercury	15 inches	15 inches	12 inches.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge		Helen	Woodland	Gibbon.
35. Number of crew		3	4	7.
36. Displacement		35	75 tons	124 tons.
37. Draft:				
(a) Forward		3 feet	22 inches	5 feet 6 inches.
(b) Aft		5 feet 9 inches	24 inches	9 feet.
Launches.				
38. Name		Palacios		
39. Length		26 feet 6 inches		
40. Beam		7 feet		
41. Depth		5 feet 6 inches		
42. Draft		3 feet		
43. Displacement		3 tons		

Barges.				Lighter No. 3.	Coal lighter No. 3.	Derrick lighter No. 3.
44. Identifying numbers of barges in use	No. 355 and No. 495	1 No. 5		Pontoons	Coal and water.	Handling anchors.
45. Usage	Coal	Oil and water				
46. Displacement, light (each)	50 long tons	60		34 tons	52.45 tons.	43.34 tons
47. Capacity of barges (each)	132 long tons	285		50 tons	125 tons	125 tons.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Mayon.*			*Miller, Col. A. M.*			*Monticello.*			*Morgan.*		
WORK PERFORMED.				Aransas Pass, Corpus Christi Channel.	Bolivar Channel.	Galveston Channel.						
48. Location of dredging	Le Claire Canal, Moline Pool, and miles 407, 417, 423, and 518.									Savannah Harbor.[1]		
49. Average depth before dredging	−2.4 to −4.55			7½ feet	17	25				17 to 24 feet, according to locality.		
50. Average depth after dredging	−4.6 to −10.4			12 feet	25	32 feet				21 to 30 feet, according to locality.		
51. Character of material dredged	Sand, gravel, and mud			Sand and mud.	Sand and mud.	Clay and mud.				Sand, mud, and hard clay.		
52. Rate of advance per hour (in feet straight ahead).	11.5 feet			20.01	13.87	13				3.02 feet (by time pumping).		
53. Amount dredged during the year	430,829 cubic yards			1,817,135 cubic yards.						551,530 cubic yards.[1]		
54. Total amount dredged by this dredge at this locality.	do			222,660	242,562	1,351,913				10,809,665 cubic yards.		
55. Average amount dredged:												
(a) Per hour (pumping)	273 cubic yards			439 cubic yards						180.3 cubic yards.		
(b) Per day	2,643.1 cubic yards			7,634 cubic yards						2,933.7 cubic yards.		
56. Maximum amount dredged in one month.	119,196.6 cubic yards			339,563 cubic yards						161,913 cubic yards.		
57. Total number of days upon which any dredging was done.	163			238						188.		
58. Average number of working hours per working day.	13 hours 6 minutes			20 hours 8 minutes						18 hours 49 minutes.		
59. Maximum number of working hours per working day.	16			23 hours 15 minutes						24.		
DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	1,578	13	18.02	4,138	30	47.24				3,057	20	34.901
(b) Handling pipe line	303	20	3.46	430	10	4.91				237		2.705
(c) Handling swinging wires (cleaning suction).	32	27	.37	153	50	1.76				106	30	1.216
(d) Going to and from wharf or anchorage.	193	52	2.21									
(e) Placing dredge	38	15	.44									
(f) Waiting for vessels to pass	13	25	.15	51	20	.58				135	45	1.550
										[illegible]2	40	[illegible]

61. Time lost from work:												
(a) Changing location of plant	178	....	2.04	473	50	5.41	....	....	....	257	50	2.043
(b) Bad weather	16	27	.19	365	50	4.18	....	....	....	93	50	1.071
(c) Washing boilers, and ordinary repairs.	20	7	.23	818	20	9.34	....	....	....	837	40	9.562
(d) Extraordinary repairs	77	46	.89	720	....	8.22	....	....	....	1,017	45	11.618
(e) Other causes	5,276	8	60.23	198	10	2.26	....	....	....	1,645	40	18.786
(f) Sundays and holidays	1,032	....	11.77	1,410	....	16.10	....	....	....	1,368	....	15.618
62. Total hours in year	8,760	....	100.00	8,760	....	100.00	8,760	....	100.00	8,760	....	100.00
63. Total time at work	2,159	32	24.65	4,773	50	54.50	....	....	....	3,539	15	40.402
64. Total time lost from work	6,600	28	75.35	3,986	10	45.50	....	....	....	4,220	45	59.598
COST OF WORK.												
Dredge.												
65. Pay rolls		$11,547.88			$33,511.91			....			$29,954.26	
66. Fuel for boilers		10,725.85			33,601.01			....			11,797.71	
67. Coal for galley		....			413.25			....			....	
68. Water		....			323.25			....			10.00	
69. Supplies, subsistence		4,071.92			10,290.67			....			12,659.07	
70. Supplies, engine room		545.84			3,259.30			....			1,940.33	
71. Other supplies		817.37			2,288.30			....			3,724.31	
72. Renewals or additions to outfit		223.31			6,876.42			....			2,023.87	
73. Ordinary repairs:												
(a) Hull		....			....			....			2,904.76	
(b) Machinery (exclusive of main dredging pump).		199.40			962.03			....			1,016.30	
74. Laundry, ice, miscellaneous expenses		303.39			470.13			....			369.91	
75. Total			$28,440.96			$91,996.27			....			$66,400.52
Main dredging pump.												
76. Diameter of runner	50 inches			84 inches			....			79½ inches.		
77. Volute (lined or unlined)	Unlined			Lined			....			Unlined.		

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Mayon.*				*Miller, Col. A. M.*				*Monticello.*				*Morgan.*			
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(a) Volute	1	......	$387.50		......	......	......		......	......	......		......	......	$3,037.53	
(b) Runner	1	......	376.21		......	......	......		......	......	......		......	......	......	
(c) Volute liners	......	......	......		......	......	$4,060.00		......	......	......		......	......	......	
(d) Runner liners	......	......	......		......	......	142.50		......	......	......		......	......	......	
(e) Head and back liners	......	......	......		......	......	540.56		......	......	......		......	......	20.30	
79. Miscellaneous repairs	......	......	212.32		......	......	......		......	......	......		......	......	6.30	
80. Total	......	......	......	$976.03	......	......	......	$4,743.06	......	......	......	......	......	......	......	$3,064.13
Pipe line.																
81. Renewals:																
(a) Rubber sleeves	12	......	570.00		......	......	889.80		......	......	......		......	......	1,020.00	
(b) Pipe	......	......	152.00		......	......	10,200.03		......	......	......		......	......	......	
(c) Pontoons	......	......	30.00		......	......	......		......	......	......		......	......	192.27	
(d) Outfit	......	......	......		......	......	......		......	......	......		......	......	......	
82. Repairs	......	......	621.27		......	......	275.89		......	......	......		......	......	......	
83. Miscellaneous	......	......	183.63		......	......	131.06		......	......	......		......	......	18.58	
84. Total	......	......	......	1,556.92	......	......	......	11,496.78	......	......	......	......	......	......	......	$1,230.85
Towboats and launches.																
85. Pay rolls			1,266.99				5,482.46				......				4,846.65	
86. Fuel for boilers			......				3,286.94				......				47.32	
87. Coal for galley			......				......				......				......	
88. Water			......				4.76				......				229.99	
89. Supplies, subsistence			41.63				968.13				......				1,884.21	
90. Supplies, engine room			......				373.13				......				125.97	
91. Launch supplies			103.36				......				......				......	
92. Other supplies			35.00				58.02				......				230.50	
93. Renewals of or additions to outfit			......				240.48				......				54.60	
94. Ordinary repairs			5.88				461.79				......				97.34	
95. Laundry, ice, miscellaneous expenses, etc			5.59				104.43				......				53.30	
96. Total				$1,458.45				$10,980.14				......				$7,569.88

Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges	....		159.42		....		....	
98. Miscellaneous expenses	....		3,660.29		....		....	
		....		3,819.71		....		....
99. Total field cost		$32,432.36		$123,035.96		....		$78,265.38
100. Total field cost per cubic yard (cents).	7.53		6.770 +				14.191	
Extra expenses.								
101. Office expenses, superintendence, surveys, etc	887.28		6,004.33		....		9,662.62	
102. Extraordinary repairs to dredge:								
(a) Hull	....		2,371.04		....		[2] 8,236.05	
(b) Machinery (exclusive of main dredging pump).	....		4,637.79		....		[2] 8,866.55	
103. Extraordinary repairs to towboats and launches.	....		....		....		[2] 379.26	
104. Extraordinary repairs to barges	....		1,572.12		....		879.00	
		....		14,585.28		....		....
105. Total		$33,319.64		$137,621.24		....		$106,288.86
106. Gross cost per cubic yard (cents)	7.73		7.573 +				19.191	
MISCELLANEOUS.								
107. Fuel consumed by dredge, tons or barrels.	1,863.05 short tons		23,502.35 barrels of 42 gallons				2,465 tons (towboat included).	
108. Fuel consumed by auxiliary plant, tons or barrels.							Included in 107.	
109. Total cost of all fuel	$6,945.45, $3.728 per ton		$36,887.95				$11,845.03.	
110. Total water purchased (gallons)			2,000,986				47,823.	
111. Cost of water per 1,000 gallons			$0.1639 +				$5.	
112. Linear feet of pipe line built during year and cost per linear foot.			16,530					
113. Average increase of depth of channel cut over.	6.5 feet		Aransas Pass 4¾ feet, Galveston Channel 8 feet, Port Bolivar Channel 7 feet.				8.06 feet.	
114. Maximum dredging depth	21 feet		45 feet		18 feet		38 feet.	
115. Number of shifts worked per day	2		3		1		3.	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Mayon.*	*Miller, Col. A. M.*	*Monticello.*	*Morgan.*
		Remarks.	*Remarks.*	*Remarks.*
		Dredge out of commission undergoing extraordinary repairs, Sept. 28 to Nov. 4, inclusive. Crude oil used as fuel purchased by barrels of 42 gallons each.	[1] Also reported in Table 7. [2] Builders: Hull and house, St. Helens Ship Building Co., St. Helens, Oreg.; machinery, Willamette Iron & Steel Works, Portland, Oreg. [3] $700 of this amount is included in the contract cost of dredge. [4] Suction outfit not operated during the year.	[1] 102,956 cubic yards dredged at Kings Island Channel, material mostly hard clay; 55,897 cubic yards dredged at City Front Channel, material mostly hard clay; 43,416 cubic yards dredged at Lower Flats; 349,261 cubic yards of redredging at Red Light dump ground. [2] Extraordinary repairs were made by Valk & Murdoch, Charleston, S. C., to dredge of approximate cost of $11,600 and to towboat of approximate cost of $3,000 during year, cost of which is not entered in operating expenses but will be included in next year's operating cost. Dredge was under repairs at Jacksonville, Fla., from Jan. 1 to Jan. 19, 1917, also under repairs at Charleston, S. C., Sept. 18 to Nov. 24, 1917. Coal purchased by long tons from Jan. 1 to Oct. 31, 1917, and by short tons from Oct. 31 to Dec. 31, 1917.

Name	*Multnomah.*	*Muscogee.*	*Orange.*
1. District	Second Portland, Oreg	Montgomery, Ala	Dallas, Tex.
2. When built	1913	1904	1912.
3. Where built	Portland, Oreg	Bainbridge, Ga	Baltimore, Md.
4. Builder	Portland Iron Works	M. A. Sweeney Shipyard & Foundry Co.	Ellicott Machine Corporation.
5. Time to build	17 months	7 months	7 months.
6. Material of hull	Steel	Yellow pine	Wood.
7. Contract cost of dredge	$174,236.50[1]	$12,900	$84,520.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) $8,108.25; (*b*) $27,341[2]	Included in contract cost	
9. Length	Hull proper, 193 feet 1¼ inches	120 feet	115 feet.
10. Beam	38 feet	30 feet	36 feet.
11. Depth	9 feet 6 inches	7.5 feet	9 feet 6 inches.
12. Draft:			
(*a*) Forward	6 feet 6 inches	2.5 feet	5 feet.
(*b*) Aft	5 feet 8 inches	do	4 feet 8 inches.
13. Displacement (long tons)	1,135	309	547.
14. Number of crew	48		34.
15. Number, size, and type of propelling engines.	None		1, triple expansion 10, 15½, 26¼ inches, stroke 14 inches.
16. Number, size, and type of pumping engines.	One 19 and 30 and 35 and 35 by 16 inches; 4-cylinder triple expansion angle engine.	One 12 and 20 by 12 inch stroke	
17. Cutter engines:			
(*a*) Diameter of cylinders	8-inch and 16-inch double cylinder tandem	8 inches	10¼ inches.
(*b*) Stroke	12 inches	10 inches	10 inches.
18. Hauling engines:			
(*a*) Diameter of cylinders	9 inches	8 inches	7 inches.
(*b*) Stroke	12 inches	12 inches	10 inches.
19. Boilers:			
(*a*) Number and type	4; Hawkes marine	1; Scotch marine, waterback	2; Scotch tubular.
(*b*) Length	13 feet 11 inches, length of drum or shell	17 feet 5 inches over all	11 feet 9 inches.
(*c*) Diameter	78 inches	8 feet	10 feet.
(*d*) Heating surface (total)	9,120 square feet	946 square feet	2,676.6 square feet.
(*e*) Grate surface (total)	208 square feet	24 square feet	91.
20. Discharge pipe in use (average number of feet).	1,915 feet		1,000.
21. Diameter of discharge pipe	24 inches, inside diameter		15 inches.
22. Pontoons:			
(*a*) Number and material of those in use (average).	57; wood		20 pairs; wood.
(*b*) Dimensions	28 feet 8 inches by 12 feet 4 inches by 2 feet 5 inches.		18 feet 10 inches by 4 feet 4 inches by 4 feet.
23. Revolutions per minute of propelling engines.	Nonpropelling		
24. Revolutions per minute of pumping engines.	190 to 215	272	235.
25. Type of agitator or cutter head	Spiral	Conical	5 blade, open type.
26. Diameter of cutter	7 feet 1½ inches over all	40 inches	5 feet, 8¼ inches.
27. Diameter of cutter shaft	7¾ inches	4 inches	6¼ inches.
28. Type of suction head	Open elliptical	Suction from within cutter head	Flared type.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Multnomah.*	*Muscogee.*	*Orange.*
29. Revolutions per minute of cutter head	8	8	10.
30. Average boiler pressure (gauge)	185 pounds	135 pounds	185 pounds.
31. Kind of coal used	Hogged wood		Fuel oil.
32. Average gauge pressure in discharge pipe.	32 pounds	7 pounds	18 pounds.
33. Average vacuum in suction pipe	16 inches	22 inches	12 inches.
ATTENDANT PLANT.			
Towboat.			
34. Name of tug attached to dredge	H. M. Adams		Beaumont.
35. Number of crew	4		2.
36. Displacement	95 tons		32 tons.
37. Draft:			
(*a*) Forward	6 feet 5 inches		2 feet 10 inches.
(*b*) Aft	7 feet		5 feet.
Launches.			
38. Name			
39. Length			
40. Beam			
41. Depth			
42. Draft			
43. Displacement			
Barges.			
44. Identifying numbers of barges in use	4, 5, 6, and 7		3, A, 4, and 6.
45. Usage	Barging fuel		Water, oil, anchor, and shore pipe.
46. Displacement, light (each)	118 tons		61, 26.8, and 14 tons.
47. Capacity of barges (each)	400 tons		
WORK PERFORMED.			
48. Location of dredging	Lower Columbia River		Waterways, vicinity of Port Arthur, Tex.
49. Average depth before dredging	26.5 feet		Port Arthur Canal, 25 feet; Sabine North Canal, 24 feet.
50. Average depth after dredging	31.5 feet		Port Arthur Canal, 26 feet; Sabine North Canal, 25 feet.
51. Character of material dredged	Sand; small per cent of gravel		Sand, silt, and soft mud.
52. Rate of advance per hour (in feet straight ahead).	8.887		26.8.

53. Amount dredged during the year	1,503,700 cubic yards.		1,014,731 cubic yards.
54. Total amount dredged by this dredge at this locality.	7,850,045 cubic yards.		4,997,464 cubic yards.
55. Average amount dredged:			
(a) Per hour (pumping)	488 cubic yards.		391 cubic yards.
(b) Per day	8,897 cubic yards.		5,989.8 cubic yards.
56. Maximum amount dredged in one month.	289,000 cubic yards.		197,511 cubic yards.
57. Total number of days upon which any dredging was done.	169.		161.
58. Average number of working hours per working day.	20.41.		21.2.
59. Maximum number of working hours per working day.	24.		24.

DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:									
(a) Pumping	3,079	20	35.15				2,576	15	29.4
(b) Handling pipe line	326	25	3.73				741	40	8.2
(c) Handling swinging wires (cleaning suction).	32	45	.37				178	10	2.5
(d) Going to and from wharf or anchorage.									
(e) Placing dredge	1	25	.02						
(f) Waiting for vessels to pass	11		.12				90	45	1.1
61. Time lost from work:									
(a) Changing location of plant	99	45	1.14				333	15	3.8
(b) Bad weather	132	20	1.51				71	25	.8
(c) Washing boilers and ordinary repairs.	260	55	2.98				861	25	9.8
(d) Extraordinary repairs	3,133	30	35.77				840		9.5
(e) Other causes	260	20	2.97	8,760		100	1,642	5	18.8
(f) Sundays and holidays	1,422	15	16.24				1,416		16.1
62. Total hours in year	8,760		100.00	8,760		100	8,760		100.0
63. Total time at work	3,450	55	39.39				3,595	50	41.0
64. Total time lost from work	5,309	5	60.61	8,760		100	5,164	10	59.0

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Multnomah.*				*Muscogee.*				*Orange.*			
COST OF WORK.												
Dredge.												
65. Pay rolls			$32,032.59								$19,963.89	
66. Fuel for boilers			[3] 5,974.91								16,760.03	
67. Coal for galley			213.80									
68. Water			20.00								55.00	
69. Supplies, subsistence			8,434.43								6,526.53	
70. Supplies, engine room			2,433.55								1,459.77	
71. Other supplies			1,026.29				$1.80				1,580.72	
72. Renewals or additions to outfit			3,210.58				41.42				2,304.24	
73. Ordinary repairs:												
(a) Hull			47.87								482.19	
(b) Machinery (exclusive of main dredging pump).			530.55								676.53	
74. Laundry, ice, miscellaneous expenses.			712.30								330.13	
75. Total				$54,636.87				$43.22				$60,229.03
Main dredging pump.												
76. Diameter of runner	6 feet 4 inches				42 inches				60 inches.			
77. Volute (lined or unlined)	Lined				Unlined				Unlined.			
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:												
(a) Volute												
(b) Runner	[4] 1	(5)	$410.16									
(c) Volute liners	[4] 11	280-2,000	259.30									
(d) Runner liners												
(e) Head and back liners	[4] 30	163-1,714	910.54									
79. Miscellaneous repairs			134.44									
80. Total				$1,713.44								

Pipe line.												
81. Renewals:												
(a) Rubber sleeves	24	860-7,620	1,249.22						72		$1,412.28	
(b) Pipe												
(c) Pontoons												
(d) Outfit			399.40									
82. Repairs			405.88								111.48	
83. Miscellaneous			69.20									
84. Total				$2,123.70								$1,523.70
Towboats and launches.												
85. Pay rolls			3,374.03								1,970.50	
86. Fuel for boilers			1,948.13								2,646.37	
87. Coal for galley			(*)									
88. Water			(*)									
89. Supplies, subsistence			(*)									
90. Supplies, engine room			(*)								270.55	
91. Launch supplies											171.45	
92. Other supplies			64.49								68.44	
93. Renewals of or additions to outfit			343.78								18.90	
94. Ordinary repairs			195.45								135.83	
95. Laundry, ice, miscellaneous expenses, etc.			18.18								28.67	
96. Total				$5,944.06								$5,310.71
Barges (amounts chargeable to dredge).												
97. Ordinary repairs to barges			33.11								12.20	
98. Miscellaneous expenses				33.11								
99. Total field cost				$64,451.18				$43.22				$57,075.64
100. Total field cost per cubic yard (cents).	4.28								5.624.			
Extra expenses.												
101. Office expenses, superintendence, surveys, etc.			9,907.63								3,193.48	
102. Extraordinary repairs to dredge:												
(a) Hull			1,079.70								2,591.30	
(b) Machinery (exclusive of main dredging pump).			1,476.92				1,354.15					
103. Extraordinary repairs to towboats and launches.			182.85									
104. Extraordinary repairs to barges			153.88	12,800.98								
105. Total				$77,252.16				$1,397.37				$62,860.51
106. Gross cost per cubic yard (cents)	5.13								6.195.			

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Multnomah.*	*Muscogee.*	*Orange.*
MISCELLANEOUS.			
107. Fuel consumed by dredge, tons or barrels.	1,642,878 cubic feet hogged wood.		11,473.97 barrels.
108. Fuel consumed by auxiliary plant, tons or barrels.	1,474.78 barrels oil.		11,169 gallons.
109. Total cost of all fuel.	$8,136.84.		$19,406.40.
110. Total water purchased (gallons).	40,000.		220,000.
111. Cost of water per 1,000 gallons.	50 cents.		$0.25.
112. Linear feet of pipe line built during year and cost per linear foot.	None.		
113. Average increase of depth of channel cut over.	5 feet.		
114. Maximum dredging depth.	55 feet.	20 feet.	
115. Number of shifts worked per day.	3.	1.	
	Remarks. Labor cost of crew operating main dredging pump, approximately $17,300; pipe line, barges, anchors, etc., approximately $12,000. [1] Does not include outfit, pipe line, nor attendant plant. [2] Includes 80 pontoons, 2,400 feet pontoon pipe, and 800 feet of shore pipe, etc. [3] 1,642,878 cubic feet hogged wood, 26 pounds per cubic foot, at 36.36 cents per 100 cubic feet. [4] Number used. [5] Two runners last about 4,000 pumping hours. [6] Supplied from dredge.	*Remarks.* Owing to lack of funds, this plant was tied up during the entire year.	*Remarks.* Work was done for the city of Port Arthur, Tex., and for the Beaumont navigation district during the year. Prices of fuel oil ranged from $1.10 to $1.75 per barrel during year.

Name	*Oregon.*	*Pascagoula.*	*Pelee.*
1. District	First Portland, Oreg	Mobile, Ala	Rock Island, Ill.
2. When built	1908	1909	1908–9.
3. Where built	Portland, Oreg	Baltimore, Md	South Stillwater, Minn.
4. Builder	Portland Iron Works	Ellicott Machine Corporation	United States.
5. Time to build	8 months	7½ months	9 months.
6. Material of hull	Wood, Oregon fir	Steel	Wood.
7. Contract cost of dredge	$79,340	$143,500	$31,965.82 (no contract).
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) $19,162.58; (*b*) included in Item 7	$53,331.71, including all attendant plant.	(*a*) Included above; (*b*) $3,193.47.
9. Length	120 feet	150 feet	119 feet.
10. Beam	36 feet	40 feet	30 feet.
11. Depth	11 feet	10 feet 6 inches	5 feet.
12. Draft:			
(*a*) Forward	5 feet 6 inches	5 feet 9 inches	2.65 feet.
(*b*) Aft	do	do	2.95 feet.
13. Displacement (long tons)	645	771	223.
14. Number of crew	23	41	19 men.
15. Number, size, and type of propelling engines.			
16. Number, size, and type of pumping engines.	1 compound ball engine, 18 and 28 by 18 inch stroke	One 12, 20 and 33 by 20 inch triple expansion.	One 12 and 24 by 14 inch cross compound condensing.
17. Cutter engines:			
(*a*) Diameter of cylinders	10 inches	11 inches	
(*b*) Stroke	12 inches	14 inches	
18. Hauling engines:			
(*a*) Diameter of cylinders	8 inches	8½ inches	8½ inches.
(*b*) Stroke	10 inches	12 inches	10 inches.
19. Boilers:			
(*a*) Number and type	2 Heine pipe boilers	2 Scotch marine	2 Hawkes.
(*b*) Length	18 feet	12 feet	16 feet.
(*c*) Diameter	14 feet	11 feet 6 inches	60 inches.
(*d*) Heating surface (total)	4,400 square feet	3,200 square feet	2,500 square feet.
(*e*) Grate surface (total)	96 square feet	100 square feet	56 square feet.
20. Discharge pipe in use (average number of feet).	1,100	1,080	600 feet.
21. Diameter of discharge pipe	18 inches	20 inches	17 inches.
22. Pontoons:			
(*a*) Number and material of those in use (average).	4 per 100 feet pontoon pipe (wood)	52, wood	10, wood.
(*b*) Dimensions	20 by 10 by 2 feet	25 feet 4 inches by 4 feet 8 inches by 5 feet.	50 by 12 feet by 2 feet 3 inches.
23. Revolutions per minute of propelling engines.			
24. Revolutions per minute of pumping engines.	203	177	235.
25. Type of agitator or cutter head	Revolving spiral	Ellicott spiral	
26. Diameter of cutter	4 feet 6 inches	4 feet 6 inches (over blades)	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Orange.*		*Pascagoula.*	*Pelee.*
27. Diameter of cutter shaft	7½ inches		7 inches (increased to 8¾ inches at cutter).	
28. Type of suction head	Open elliptical		Ellicott	Plain square.
29. Revolutions per minute of cutter head	7		13	
30. Average boiler pressure (gauge)	125 pounds		178 pounds	145 pounds.
31. Kind of coal used	Fuel oil		Bituminous	Bituminous lump and mine run.
32. Average gauge pressure in discharge pipe.	33 pounds		26 pounds	14 pounds.
33. Average vacuum in suction pipe	12 inches		15 inches	18 inches of mercury.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge		Walter		
35. Number of crew		1		
36. Displacement		12 tons		
37. Draft:				
(*a*) Forward		4 feet 8 inches		
(*b*) Aft		do		
Launches.				
38. Name	Eva		Biloxi	
39. Length	54 feet		40 feet	
40. Beam	12 feet		13 feet	
41. Depth	3 feet 6 inches		4 feet 7 inches	
42. Draft	4 feet 6 inches		4 feet 1 inch	
43. Displacement	7 tons		25 tons	
Barges.				
44. Identifying numbers of barges in use	Nos. 13 and 14		G and H	No. 238 and No. 239.
45. Usage	Fuel and water	General utility and water	Coal and water	Coal.
46. Displacement, light (each)	Total, 42 tons	32 and 27 tons	104 tons and 23 tons	32 long tons.
47. Capacity of barges (each)	Total, 110 tons	129 and 40 tons	340 tons and 64 tons	90 long tons.
WORK PERFORMED.				
48. Location of dredging	Vancouver, Wash	Chehalis and Hoquiam Rivers	Pascagoula Harbor, Miss	Miles 10, 21, 24, 25, 26, 28, 34, 96, and 112.
49. Average depth before dredging	(1)	18 feet	15.6 Government work; 2.5 private work.	−2.7 to −5.6.
50. Average depth after dredging	(1)	25 feet	23.2 Government work; 15 private work.	−7.4 to −8.4.

51. Character of material dredged	Coarse heavy sand	Mud and sand		
52. Rate of advance per hour (in feet straight ahead).	(1)	Average, 8 feet	5.52 feet	26 feet.
53. Amount dredged during the year	105,000 cubic yards	295,782 cubic yards	1,037,296.4 cubic yards within theoretical section.[1]	340,713 cubic yards.
54. Total amount dredged by this dredge at this locality.	(1)	do	1,160,218.8 cubic yards during calendar year 1917.[2]	Do.
55. Average amount dredged:				
(a) Per hour (pumping)	136 cubic yards	642.79 cubic yards	345.54 cubic yards	325.4 cubic yards.
(b) Per day	1,554 cubic yards	3,213.97 cubic yards	5,346.89 cubic yards	3,307.9 cubic yards.
56. Maximum amount dredged in 1 month	40,000 cubic yards	91,852 cubic yards	325,927.8 cubic yards	107,069 cubic yards.
57. Total number of days upon which any dredging was done.	70	90	194	103.
58. Average number of working hours per working day.	12 hours 15 minutes	5 hours 7 minutes	19.45	12 hours 39 minutes.
59. Maximum number of working hours per working day.	16	7 hours 25 minutes	24	16.

DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	789	20	26.5	488	25	9.60	3,001	56	34.27	1,047	20	11.96
(b) Handling pipe line	76	10	3.0	75	5	1.57	661	19	7.55	99	10	1.13
(c) Handling swinging wires (cleaning suction)					45	.01	108	13	1.24	58	55	.67
(d) Going to and from wharf or anchorage				3		.04				78	20	.89
(e) Placing dredge	55	40	2.0	6	30	.10				82	55	.95
(f) Waiting for vessels to pass							2	55	.03	50	45	.58
61. Time lost from work:												
(a) Changing location of plant	103		3.0	29	35	.57	139	21	1.59	348		3.97
(b) Bad weather	36		1.0	34	30	.67	104	10	1.19			
(c) Washing boilers and ordinary repairs	34	15	1.0	16		.30	2,222	24	25.37	1	45	.02
(d) Extraordinary repairs	17	5	.5	560	30	11.00	289	30	3.30	54	20	.62
(e) Other causes	538	35	19.0	3,082	45	60.58	682	12	[3] 7.79	6,242	30	71.26
(f) Sundays and holidays	1,277	55	44.0	792		15.56	1,548		17.67	696		7.95
62. Total hours in year	8,760		100.00	8,760		100.00	8,760		100.00	8,760		100.00
63. Total time at work	921	10		488			3,774	23	43.09	1,417	25	16.18
64. Total time lost from work	2,006	50		4,597			4,985	37	56.91	7,342	35	83.82

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Oregon.*				*Pascagoula.*		*Pelee.*	
COST OF WORK.								
Dredge.								
65. Pay rolls	$6,331.41		$7,831.68		$26,040.98		$8,402.24	
66. Fuel for boilers	4,818.99		4,287.00		[4] 14,699.49		4,599.65	
67. Coal for galley	72.50		90.30		[4] 121.65		....	
68. Water	8.40		60.89		32.25		....	
69. Supplies, subsistence	1,556.96		1,876.50		8,599.51		2,179.93	
70. Supplies, engine room	164.43		191.21		6,364.60		516.12	
71. Other supplies	116.89		310.33		1,740.75		311.65	
72. Renewals or additions to outfit	124.94		1,087.09		6,295.10		749.31	
73. Ordinary repairs:								
(a) Hull	36.53		....		2,081.49		74.71	
(b) Machinery (exclusive of main dredging pump).	18.00		218.75		796.21		311.57	
74. Laundry, ice, miscellaneous expenses.	81.77		258.63		583.23		86.63	
75. Total		$13,280.82		$16,162.38		$67,355.26		$17,231.81
Main dredging pump.								
76. Diameter of runner	6 feet		6 feet		72 inches		50 inches.	
77. Volute (lined or unlined)	Lined		Lined		Unlined		Unlined.	

	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.
78. Renewals:												
(a) Volute	......	......	......	......	......	......	......	......	......	......	......	$232.00
(b) Runner	......	......	......	......	......	......	......	......	......	......	......	......
(c) Volute liners	......	......	......	......	......	......	......	......	......	......	......	......
(d) Runner liners	......	......	......	......	......	......	2	([5])	$182.54	......	......	......
(e) Head and back liners	3	......	$588.81	......	......	$266.70	2	([5])	199.16	......	......	......

80. Total				636.32				885.88				371.70				415.67
Pipe line.																
81. Renewals:																
(a) Rubber sleeves					8		353.45		137	([6])	4,088.66		18		734.40	
(b) Pipe													[1] 665		7,785.00	
(c) Pontoons																
(d) Outfit							568.02									
82. Repairs							394.19				5,110.55					
83. Miscellaneous							495.56				108.18					
84. Total								1,811.22				9,307.39				8,519.40
Towboats and launches.																
85. Pay rolls											1,979.04				157.06	
86. Fuel for boilers															131.69	
87. Coal for galley																
88. Water																
89. Supplies, subsistence											562.04					
90. Supplies, engine room															199.14	
91. Launch supplies											1,827.57					
92. Other supplies																
93. Renewals of or additions to outfit															10.98	
94. Ordinary repairs											54.02				127.82	
95. Laundry, ice, miscellaneous expenses, etc.							[1] 1,527.50				[7] 424.49					
96. Total				[3] 3,131.10				1,527.50				4,847.16				626.69
Barges (amounts chargeable to dredge).																
97. Ordinary repairs to barges							30.80								20.48	
98. Miscellaneous expenses							[2] 88.00	118.80								
99. Total field cost				$17,048.24				$20,005.78				$31,881.51				$26,814.05
100. Total field cost per cubic yard (cents).	16.23								7.804				7.87.			

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name.	*Oregon.*				*Pascagoula.*		*Peter.*	
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	$199.56		$450.00		$5,824.36		$725.14	
102. Extraordinary repairs to dredge:								
(*a*) Hull	....		4,353.17		2,950.15		....	
(*b*) Machinery (exclusive of main dredging pump).	96.10		1,332.30		4,531.15		....	
103. Extraordinary repairs to towboats and launches.	....		....		337.67		....	
104. Extraordinary repairs to barges	....	$295.66	....	$6,135.47	387.14	$14,030.47	....	
105. Total		17,343.90		26,141.25		95,911.98		$27,539.19
106. Gross cost per cubic yard (cents)	16.518		9		9.246		8.08.	
MISCELLANEOUS.								
107. Fuel consumed by dredge, tons or barrels.	3,011.87 barrels		2,716 barrels oil, 40 cords wood		5,091.83 short tons		1,281.87 short tons.	
108. Fuel consumed by auxiliary plant, tons or barrels.					137 barrels			
109. Total cost of all fuel	$4,891.49		$4,327.30		$16,570.45		$5,458.20; $4.258 per ton.	
110. Total water purchased (gallons)	26,182		225,524 at 27 cents (average)		144,269 gallons			
111. Cost of water per 1,000 gallons	$0.33		27 cents, average		15 to 25 cents			
112. Linear feet of pipe line built during year and cost per linear foot.								
113. Average increase of depth of channel cut over.	(1)		9.2 feet		7.6 feet and 17.5 feet		3.8 feet.	
114. Maximum dredging depth	35 feet		35 feet		40 feet		21 feet.	
115. Number of shifts worked per day	3		3		3		2.	
	Remarks.		*Remarks.*		*Remarks.*		*Remarks*	
	[1] Dredge was not making cut for channel, but was making fill for roadway 3,600 feet long with average width of 75 feet. Length and depth of cut a secondary consideration. [2] Hire of launch tender, $1,090.50; towing of dredge from Grays Harbor to Vancouver, Wash., $1,125; transportation by rail of pipe and pontoons, $906.00.		On June 11, 1917, the dredge was moved to the plant of the Eureka Cedar Lumber & Shingle Co., Hoquiam, Wash., and under authority of the Chief of Engineers, dated May 26, 1917, E. D. File 103038/2, dredged 104,730 cubic yards, completing the work on July 28, 1917. Expenses during this time were borne by the Eureka Cedar Lumber & Shingle Co.		[1] Government work, 860,164.6 cubic yards; private work, 177,131.8 cubic yards. [2] Government work, 983,087 cubic yards; private work, 177,131.8 cubic yards. [3] 468 hours of this time was due to dredge being out of commission due to lack of funds. [4] Of the total coal shown, 1,180 tons, valued at $6,400, was furnished by private corpora-		[1] Linear feet.	

dredging pump and pipe line impracticable to estimate.

Fuel purchased by the barrel of oil, and cord of wood (128 cubic feet).

The dredge Oregon was transferred from the Portland, Oreg., first district, arriving at Grays Harbor Feb. 6, 1917. Left the Seattle, Wash., district Sept. 21, 1917, returning to the first Portland, Oreg., district.

[1] Launch hire.

[2] Lease of scows.

work.

[5] Not yet in use.

[6] Of the 137 sleeves purchased 8 were worn out by storm after a total of 1,024 hours, 31 were used for 30,633.6 hours and are still in service, 65 were worn out after 132,783.9 hours, 5 were transferred to dredge Wahalak, 11 were transferred to dredge Gulfport, 10 were not connected and are on hand, 7 were received from Gulfport and were worn out after 5,091.7 hours.

[7] This amount includes $418.51 charged by steamer Chickasaw and launch Dauphin for towing in connection with the dredging work.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name.	*Pettus.*	*Portland.*	*Sacramento.*	*San Bernard.*
1. District	Montgomery, Ala.	Louisville, Ky	Third San Francisco, Cal	Galveston, Tex.
2. When built	Hull, 1908; cabin and machinery, 1909.	1914	1913	1906.
3. Where built	Hull, Gulfport, Miss.; cabin, Montgomery, Ala.	Jeffersonville, Ind	Baltimore, Md., and Pittsburg, Cal.	Galveston, Tex.
4. Builder	United States	Ed. J. Howard [1]	Ellicott Machine Co	Bowers Southern Dredging Co.
5. Time to build	1 year	2 months	13 months	4 months.
6. Material of hull	Creosoted yellow pine	Steel	Steel	Wood.
7. Contract cost of dredge		$5,825 (hull)	$176,800	$29,500.
8. (*a*) Cost of outfit; (*b*) cost of pipe line.	(*a*) $62,352.25; (*b*) $2,063.80	(*a*) $13,331.95	(*a*) $45,326.65; (*b*) $12,500	
9. Length	135 feet	100 feet	150 feet	83 feet.
10. Beam	35 feet	22 feet	40 feet	32 feet.
11. Depth	6 feet 6 inches	5 feet	11 feet 6 inches	7 feet 6 inches.
12. Draft:				
(*a*) Forward	4 feet	2 feet 6 inches	6 feet 6 inches	5 feet 6 inches.
(*b*) Aft	4 feet 3 inches	3 feet 2 inches	7 feet 6 inches	4 feet 6 inches.
13. Displacement (long tons)	488	131	984 (at 7-foot draft)	440.
14. Number of crew	40	8	42	40.
15. Number, size, and type of propelling engines.	2 horizontal, direct-acting; cylinders 15 by 72 inches.			
16. Number, size, and type of pumping engines.	1 cross compound (Ball Engine Co.) 13 and 20 by 16 inch stroke.	One 16 by 22 inches; horizontal, single cylinder.	One 14, 22½ inch and 40 by 20 inch vertical triple expansion.	One 18 by 11½ inch double cylinder, condensing.
17. Cutter engines:				
(*a*) Diameter of cylinders	8½ inches		11 inches	8 inches.
(*b*) Stroke	12 inches		14 inches	10 inches.
18. Hauling engines:				
(*a*) Diameter of cylinders	7 inches	7½ inches	8½ inches	6 inches.
(*b*) Stroke	10 inches	10 inches	12 inches	10 inches.
19. Boilers:				
(*a*) Number and type	2 western river type; 5 flues each.	2 Scotch marine	4 Scotch marine	1 Scotch marine.
(*b*) Length	30 feet	10 feet 1 inch	11 feet 4 inches	11 feet.
(*c*) Diameter	42 inches	6 feet 6 inches	10 feet 6 inches	10 feet 6 inches.
(*d*) Heating surface (total)	1,755 square feet	600 square feet	4,752 square feet	1,273 square feet.
(*e*) Grate surface (total)	65 square feet	17½ square feet	150.8 square feet (oil used for fuel)	38 square feet.
20. Discharge pipe in use (average number of feet).	200	200	2,880	200.
21. Diameter of discharge pipe	15 inches	12 inches	20 inches	15 inches.
22. Pontoons:				
(*a*) Number and material of those in use (average).	20, steel		20, wood	6, wood.
(*b*) Dimensions	6 by 16 feet by 22 inches		36 by 10 feet by 2 feet 6 inches	20 by 8 by 6 feet.

23. Revolutions per minute of propelling engines.	18				
24. Revolutions per minute of pumping engines.	244	150	171	76.	
25. Type of agitator or cutter head	Spiral type, revolving		Ellicott spiral	Open rotary.	
26. Diameter of cutter	4 feet 11 inches		6 feet 7 inches	4 feet 6 inches.	
27. Diameter of cutter shaft	6 inches		7 inches	4 inches.	
28. Type of suction head	Suction within cutter head		Ellicott	Open.	
29. Revolutions per minute of cutter head	7		18	19.	
30. Average boiler pressure (gauge)	150 pounds	125 pounds	186 pounds	95 pounds.	
31. Kind of coal used	Bituminous	West Kentucky, run of mine	Fuel oil	Crude oil.	
32. Average gauge pressure in discharge pipe.	12 pounds	15 pounds	35.1 pounds	3.5 pounds.	
33. Average vacuum in suction pipe	20 inches	25 inches	15.4 inches	11 inches.	
ATTENDANT PLANT.					
Towboat.					
34. Name of tug attached to dredge			Rio Vista [1]		
35. Number of crew			2		
36. Displacement			45.5 tons		
37. Draft:					
(*a*) Forward			4 feet		
(*b*) Aft			5 feet 4 inches		
Launches.					
38. Name			Clyde	Bastrop.	Hill.
39. Length			42 feet	46 feet 6 inches	31 feet 5 inches
40. Beam			9 feet 10 inches	11 feet 6 inches	8 feet 5 inches.
41. Depth			4 feet	5 feet	4 feet.
42. Draft			3 feet 8 inches		
43. Displacement			9 long tons	16 tons	7 tons.
Barges.					
44. Identifying numbers of barges in use	Nos. 13, 28, and 43	Nos. 22, 23, 24, 25, 26, 27, 28, and 29.	2 unnumbered	2.	
45. Usage	Coal and extra parts	Towing sand and gravel	General use	Oil and water.	
46. Displacement, light (each)	13–42 tons; 28–90 tons; 43–58 tons.	78 tons	15 tons	60 tons (both).	
47. Capacity of barges (each)	13–100 tons; 28–300 tons; 43–200 tons.	365 tons	40 tons	150 tons (both).	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Pettus.*	*Portland.*	*Sacramento.*	*San Bernard.*		
WORK PERFORMED.						
48. Location of dredging	Alabama River	Dam No. 43, Ohio River	In lower Sacramento River and at Mare Island Straits.	Intercoastal Canal.	West Galveston Bay.	Fort Travis.
49. Average depth before dredging	3 feet	5 feet [2]	−1.9 in lower Sacramento River and 20.7 at Mare Island Straits.	*Feet.* 3	*Feet.* 4	*Feet.* 3
50. Average depth after dredging	6.5 feet	10 feet	19.4 in lower Sacramento River and 30.3 at Mare Island Straits.	7	7	10
51. Character of material dredged	Gravel, 60 per cent; sand, 40 per cent.	Sand and gravel	Peat, sand, clay, and sediment	Sand, shell, mud, silt, and clay.	Sand.	Sand.
52. Rate of advance per hour (in feet straight ahead).	16.3		4.1 feet in lower Sacramento River and 10 feet in Mare Island Straits.			
53. Amount dredged during the year	36,336 cubic yards	6,891 cubic yards	1,714,321 in lower Sacramento River, 920,000 cubic yards in Mare Island Straits.[3]	*Cubic yds.*	*Cubic yds.* 553,176	*Cubic yds.*
54. Total amount dredged by this dredge at this locality.	1,723,456 cubic yards	93,546 cubic yards	13,912,723 cubic yards in lower Sacramento River, 920,000 cubic yards in Mare Island Straits.	511,005	27,377	14,794
55. Average amount dredged:						
(a) Per hour (pumping)	208.3 cubic yards	41.26 cubic yards	735 cubic yards	32.7226.		
(b) Per day	2,274 cubic yards	328.14 cubic yards	10,150 cubic yards	5,587.6363.		
56. Maximum amount dredged in one month.	14,262 cubic yards	2,550 cubic yards	400,063 cubic yards	162,711.		
57. Total number of days upon which any dredging was done.	38	38	250	99.		
58. Average number of working hours per working day.	10 hours 55 minutes	8	16 hours 48 minutes	19 hours 32 minutes.		
59. Maximum number of working hours per working day.	12 hours 45 minutes	24	23 hours 35 minutes	24.		

DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	174	24	1.99	167		1.90	3,586	40	40.91	1,690	30	23.17
(b) Handling pipe line	31	30	.36				447	15	5.12	62	25	.86
(c) Handling swinging wires (cleaning suction).	22	15	.26	13		.15	262	45	3.00	166	55	2.29
(d) Going to and from wharf or anchorage.												
(e) Placing dredge				24		.28	55		.63			
(f) Waiting for vessels to pass	4	45	.06				1	10	.01	13	35	.19
61. Time lost from work:												
(a) Changing location of plant	60	30	.69	15		.17	254	55	2.91	317	50	4.36
(b) Bad weather	18		.21				17	15	.20	5	35	.08
(c) Washing boilers and ordinary repairs.	42	15	.48	41		.47	211	35	2.44	91	5	1.24
(d) Extraordinary repairs							940	50	10.74	352		4.82
(e) Other causes	6,990	21	79.80	7,060		80.59	1,566	35	17.88	4,020	5	55.10
(f) Sundays and holidays	1,416		16.16	1,440		16.44	1,416		16.16	576		7.89
62. Total hours in year	8,760		100.00	8,760		100.00	8,760		100.00	8,760		100.00
63. Total time at work	232	54	2.66	204		2.33	4,352	50	49.68	1,933	25	26.50
64. Total time lost from work	8,527	6	97.34	8,556		97.67	4,407	10	50.32	5,362	35	73.50
COST OF WORK.												
Dredge.												
65. Pay rolls		$1,513.40			$988.41			$36,868.96			$11,606.62	
66. Fuel for boilers		559.07			401.70			25,727.69			4,647.97	
67. Coal for galley											192.50	
68. Water								122.88			34.41	
69. Supplies, subsistence		503.82						9,327.57			3,347.89	
70. Supplies, engine room		25.67			8.83			1,185.57			722.89	
71. Other supplies					11.10			1,738.60			508.35	
72. Renewals or additions to outfit		50.00						3,459.57			742.97	
73. Ordinary repairs:												
(a) Hull					113.82			1,431.86			151.26	
(b) Machinery (exclusive of main dredging pump).					449.24			389.55			632.94	
74. Laundry, ice, miscellaneous expenses.					7.72						318.78	
75. Total			$2,651.96			$1,980.82			$80,252.25			$22,906.58
Main dredging pump.												
76. Diameter of runner	4 feet 2 inches						96 inches					
77. Volute (lined or unlined)	Lined						Unlined					

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Pettus.*				*Portland.*				*Sacramento.*				*San Bernard.*			
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
COST OF WORK—continued.																
Main dredging pump—Continued.																
78. Renewals:																
(a) Volute									1		$1,030.25					
(b) Runner									1		1,424.54					
(c) Volute liners									[4]1		237.93					
(d) Runner liners									[5]2		46.34					
(e) Head and back liners									2		328.93					
79. Miscellaneous repairs			$7.80								873.60					
80. Total				$7.80								$3,941.59				
Pipe line.																
81. Renewals:																
(a) Rubber sleeves									45		$2,768.90				$277.20	
(b) Pipe			24.50						[6]1,406		5,754.74				52.01	
(c) Pontoons									20		3,220.00					
(d) Outfit																
82. Repairs											248.98					
83. Miscellaneous											4,604.62				49.50	
84. Total				$24.50								$16,597.24				$378.71
*Towboats and launches.***																
85. Pay rolls											$1,334.12				$1,285.55	
86. Fuel for boilers											1,010.78				1,186.04	
87. Coal for galley																
88. Water																
89. Supplies, subsistence											233.55				296.84	
90. Supplies, engine room											34.92				293.02	
91. Launch supplies											6.92				250.64	
92. Other supplies											5.79				35.01	
93. Renewals of or additions to outfit											170.81				28.05	

94. Ordinary repairs					32.11		2.72	
95. Laundry, ice, miscellaneous expenses, etc.					231.44		695.29	
96. Total						$3,065.94		$4,185.16
Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges								
98. Miscellaneous expenses					113.21			
99. Total field cost		$2,684.26		$1,980.82		$103,979.23		$27,470.45
100. Total field cost per cubic yard (cents)	0.07387		28.74		0.659			
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	$349.90				[3] 5,706.70		820.66	
102. Extraordinary repairs to dredge:								
(a) Hull	234.02				1,628.64		17.50	
(b) Machinery (exclusive of main dredging pump)	605.58				2,675.36		293.48	
103. Extraordinary repairs to towboats and launches					107.50			
104. Extraordinary repairs to barges								
105. Total	1,189.50	3,873.76		1,980.82		10,118.20 114,097.43		1,131.64 28,602.09
106. Gross cost per cubic yard (cents)	0.10661		28.74		0.043		0.051705 plus.	
MISCELLANEOUS.								
107. Fuel consumed by dredge, tons or barrels	159 tons		157.53 short tons [3]		24,864.61		3,839 barrels., or 1,232,319 pounds.	
108. Fuel consumed by auxiliary plant, tons or barrels					11,696 gals. distillate to 9½ per gal.		6,030 gallons., or 143.5714 plus barrels.	
109. Total cost of all fuel	$559.07		$401.70		Fuel oil 0.89 to 1.76 per barrel, distillate 9.		$5,834.01.	
110. Total water purchased (gallons)					$0.20 to $0.23		$0.22255 plus.	
111. Cost of water per 1,000 gallons					580,630 gallons		65,850 gallons.	
112. Linear feet of pipe line built during year and cost per linear foot					16,100 feet, cost indeterminate		Intercoastal Canal, 4 feet; West Galveston Bay, 3 feet; Fort Travis, 7 feet.	
113. Average increase of depth of channel cut over	3.5 feet				16.4			
114. Maximum dredging depth			24 feet		47 feet		25 feet.	
115. Number of shifts worked per day	3		1		3		3.	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Pettus.*	*Portland.*	*Sacramento.*	*San Bernard.*
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	No separate labor cost kept. All coal was purchased by long ton. During parts of the months of November and December, this plant was used to fill in the low places in the jetties with gravel where piles could not be driven because of rock bottom. 31,788 cubic yards were pumped into 11 jetties, aggregating 2,313 feet long.	[1] House and outfit installed by the United States. [2] Dredge rigged as sand and gravel digger. It was employed intermittently during the year in dredging sand and gravel for use in concrete, and in pumping out cofferdams, etc. [3] Fuel was purchased by the short ton.	Fuel bought by barrel of 42 gallons, gallon of fuel oil weighs approximately 7.75 pounds. [1] This figure is not the sum of those given for each month, as the yardage dredged at Mare Island Straits was measured by the navy yard and their monthly estimates were greatly modified (increased) by the final figures rendered. [2] Used also by dredge San Joaquin. [3] Does not include all office and survey expenses incurred by navy yard, as a complete statement of these was not furnished this office. [4] Suction mouth price. [5] Suction mouth liners. [6] Linear feet.	The last dredging performed by San Bernard in this district was on May 14, 1917. She was laid up after that date because of no work to be done. Extraordinary repairs were started on Sept. 24 and completed Nov. 12. Dredge was hauled out on Lynchburg Ways Sept. 24 and launched Oct. 18. Dredge departed from Galveston for New Orleans district Nov. 18, 1917. This report is from Jan. 1 to Oct. 31, 1917, inclusive.

Name	*San Jacinto.*	*San Joaquin.*	*San Pedro.*
1. District	Galveston	Third, San Francisco, Cal.	Los Angeles, Cal.
2. When built	1915	1913	1904.
3. Where built	Galveston, Tex.	Baltimore, Md., and Pittsburg, Cal.	Hull at Los Angeles; machinery at Baltimore, Md.
4. Builder	Bowers Southern Dredging Co.	Ellicott Machine Co.	Ellicott Machine Co.
5. Time to build	1 year	13 months	15 months.
6. Material of hull	Wood	Steel	Wood.
7. Contract cost of dredge	$150,972.50	$176,800	$98,400.
8. (*a*) Cost of outfit; (*b*) cost of pipe line		(*a*) $45,326.65; (*b*) $12,500	(*a*) $9,600; (*b*) $22,200.
9. Length	148 feet	150 feet	140 feet 8 inches.
10. Beam	38 feet	40 feet	40 feet 8 inches.
11. Depth	12 feet	11 feet 6 inches	10 feet 7 inches.
12. Draft:			
(*a*) Forward	5 feet 9 inches	6 feet 6 inches	5.5 feet.
(*b*) Aft	6 feet 9 inches	7 feet 6 inches	Do.
13. Displacement (long tons)	981	984 (at 7-foot draft)	834.
14. Number of crew	51	42	34.
15. Number, size, and type of propelling engines.			
16. Number, size, and type of pumping engines.	One 14, 22½ by 40 and 20 inch vertical, triple expansion	One 14, 22½ by 40 and 20 inch vertical triple expansion.	One 12, 20, and 33 by 20 inch triple expansion, marine type.
17. Cutter engines:			
(*a*) Diameter of cylinders	12 inches	11 inches	Two, 10 inches.
(*b*) Stroke	14 inches	14 inches	14 inches.
18. Hauling engines:			
(*a*) Diameter of cylinders	10 inches	8½ inches	Two, 7 inches.
(*b*) Stroke	12 inches	12 inches	7 inches.
19. Boilers:			
(*a*) Number and type	2 Babcock & Wilcox, water tube	4 Scotch marine	2 Babcock & Wilcox semimarine.
(*b*) Length	13 feet 8 inches (over all)	11 feet 4 inches	Drums, 96 inches.
(*c*) Diameter	8 feet 8 inches (width)	10 feet 6 inches	Drums, 42 inches.
(*d*) Heating surface (total)	4,390 square feet	4,752 square feet	4,000 square feet.
(*e*) Grate surface (total)	None (oil burners)	150.8 square feet (oil used for fuel)	88 square feet.
20. Discharge pipe in use (average number of feet).	1,200	3,910	1,947.
21. Diameter of discharge pipe	20 inches	20 inches	20 inches.
22. Pontoons:			
(*a*) Number and material of those in use (average).	23 pairs steel	16, wood	41, wood.
(*b*) Dimensions	3 feet 10 inches by 25 feet	36 by 10 feet by 2 feet 6 inches	21 feet 3 inches by 10 feet by 3 feet; 35 feet by 10 feet by 3 feet.
23. Revolutions per minute of propelling engines.			
24. Revolutions per minute of pumping engines.	150	176	150 to 180.
25. Type of agitator or cutter head	Open rotary	Ellicott spiral	Rotary.
26. Diameter of cutter	6 feet 6 inches	6 feet 7 inches	6 feet.
27. Diameter of cutter shaft	8 inches	7 inches	7 inches.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*San Jacinto.*			*San Joaquin.*	*San Pedro.*
28. Type of suction head	Open			Ellicott	Ellicott.
29. Revolutions per minute of cutter head.	12 to 14			16	12.
30. Average boiler pressure (gauge)	200 pounds per square inch			185	200 pounds.
31. Kind of oil used	Crude oil			Fuel oil	Fuel oil.
32. Average gauge pressure in discharge pipe.	30 pounds			39.1 pounds	25 pounds.
33. Average vacuum in suction pipe	18 inches			15.3 inches	16 inches.
ATTENDANT PLANT.					
Towboat.					
34. Name of tug attached to dredge	Capt. Talfor			Rio Vista[1]	
35. Number of crew	7			2	
36. Displacement	43 tons			45.5 tons	
37. Draft:					
(*a*) Forward	7 feet			4 feet	
(*b*) Aft	8 feet			5 feet 4 inches	
Launches.					
38. Name	Copano			Clyde	Cerritos.
39. Length	28 feet 6 inches			42 feet	28 feet 6 inches.
40. Beam	7 feet			9 feet 10 inches	9 feet 6 inches.
41. Depth	4 feet 5 inches			4 feet	4 feet 6 inches.
42. Draft	2 feet 2 inches			3 feet 8 inches	4 feet.
43. Displacement	2 tons			9 long tons	7.82 tons.
Barges.					
44. Identifying numbers of barges in use.	1 No. 9			2 (unnumbered)	5.
45. Usage	Oil and water			General use	Fuel, water, and work.
46. Displacement, light (each)				15 tons	9 tons.
47. Capacity of barges (each)	226.18 tons			40 tons	36.8 tons.
WORK PERFORMED.	Houston Ship Channel.	Goose Creek Channel.			
48. Location of dredging			Southwest Pass and Head of Passes, Mississippi River.	In lower Sacramento River and in Mare Island Straits.	
49. Average depth before dredging	16 feet	1 foot	25.3	5 in lower Sacramento River, 23.7 at Mare Island Straits.	
50. Average depth after dredging	28 feet	12 feet	40	24.2 in lower Sacramento River, 31.3 at Mare Island Straits.	

51. Character of material dredged	Silt, shell, sand, mud, and clay.	Mud, sand, and clay.	Hard packed sand, sand, and silt.	Sand, peat, clay, silt, and rock	
52. Rate of advance per hour (in feet straight ahead).	18 feet	14 feet	13.96	6	
53. Amount dredged during the year	211,738 cubic yards.		2,972,959	1,328,082 in lower Sacramento, 1,180,000 at Mare Island Straits.[3]	
54. Total amount dredged by this dredge at this locality.	73,435 cubic yards.	138,298 cubic yards.	526,741 Southwest Pass, 2,446,218 Head of Passes.	11,185,038 in lower Sacramento, 1,180,000 at Mare Island Straits.[3]	9,428,906 cubic yards.
55. Average amount dredged:					
(a) Per hour (pumping)	581.2848 cubic yards		1,692	615	
(b) Per day	6,830.097 cubic yards		27,027	9,500	
56. Maximum amount dredged in one month.	137,814 cubic yards		794,666	309,134 cubic yards	
57. Total number of days upon which any dredging was done.	31		110	265	
58. Average number of working hours per working day.	19 hours 37 minutes		21 hours 9 minutes	18 hours 29 minutes	
59. Maximum number of working hours per working day.	24		24	23 hours 45 minutes	

DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	364	15	10.05	1,757	26	36.0	3,982	10	45.46			
(b) Handling pipe line	217		5.99	367	19	7.5	714	40	8.16			
(c) Handling swinging wires (cleaning suction)	26	50	.74	80	15	1.6	178	55	2.05			
(d) Going to and from wharf or anchorage												
(e) Placing dredge				120	30	2.5	18		.21			
(f) Waiting for vessels to pass				354		7.0	7	30	.09			
61. Time lost from work:												
(a) Changing location of plant	17	40	.49	147	40	3.0	199	25	2.28			
(b) Bad weather				117	35	2.5						
(c) Washing boilers and ordinary repairs	76	15	2.10	392	21	8.0	11	10	.13			
(d) Extraordinary repairs	2,304		63.58	113	30	2.5	859	55	9.77			
(e) Other causes	66		1.82	472	55	9.6	1,372	15	15.67			
(f) Sundays and holidays	552		15.23	972		19.8	1,416		16.18			
62. Total hours in year	8,760		100.00	8,760		100.00	8,760		100.00	8,760		100.00
63. Total time at work	608	5	16.78	2,679	29	55.00	4,901	15	55.95			
64. Total time lost from work	3,015	55	83.22	2,216	31	45.00						

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*San Jacinto.*				*San Joaquin.*		*San Pedro.*	
COST OF WORK.								
Dredge.								
65. Pay rolls	$13,421.97		$21,242.74		$37,871.77		$1,690.35	
66. Fuel for boilers	3,430.71		28,179.38		28,570.83		....	
67. Coal for galley	160.75		45.04		....		....	
68. Water	27.79		....		140.86		....	
69. Supplies, subsistence	3,757.04		6,532.26		9,501.32		....	
70. Supplies, engine room	634.35		2,462.89		1,490.74		....	
71. Other supplies	768.26		6,545.51		1,698.70		....	
72. Renewals or additions to outfit	1,313.91		8,779.55		3,942.16		....	
73. Ordinary repairs:								
(*a*) Hull	391.85		....		....		32.70	
(*b*) Machinery (exclusive of main dredging pump).	700.97		148.18		1,459.85		....	
74. Laundry, ice, miscellaneous expenses.	260.40		602.11		392.16		....	
75. Total		$24,868.00		$74,537.66		$85,158.39		$1,723.05
Main dredging pump.								
76. Diameter of runner	....		96 inches		96 inches		84 inches.	
77. Volute (lined or unlined)	....		Lined		Unlined		Unlined.	

	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(*a*) Volute	......	......	......		......	......	......		1	......	$918.52		......	......	......	
(*b*) Runner	......	......	......		......	......	......		1	......	823.64		......	......	......	
(*c*) Volute liners	......	......	......		......	......	......		......	......	......		......	......	......	
(*d*) Runner liners	......	......	......		......	......	$1,310.00		......	......	......		......	......	......	
(*e*) Head and back liners	......	......	$296.67		......	......	......		1	......	328.93		......	......	......	
79. Miscellaneous repairs	......	......	......		......	......	......		......	......	157.69		......	......	......	
80. Total	......	......	......	$296.67	......	......	......	$1,310.00	......	......	......	$2,228.78	......	......	......	

Pipe line.																
81. Renewals:																
(a) Rubber sleeves	......	......	$451.92		......	......	$3,924.55		66	......	$2,871.30		......	......	......	
(b) Pipe	......	......	......		......	......	......		[3]1,406	......	5,754.74		......	......	......	
(c) Pontoons	......	......	......		......	......	......		10	......	3,220.00		......	......	......	
(d) Outfit	......	......	......		......	......	......		......	......	......		......	......	......	
82. Repairs	......	......	224.50		......	......	......		......	......	267.42		......	......	......	
83. Miscellaneous	......	......	......		......	......	11.48		......	......	4,604.79		......	......	......	
84. Total	......	......	......	$676.42	......	......	......	$3,936.03	......	......	......	$16,718.25	......	......	......	
Towboats and launches.																
85. Pay rolls			$1,175.00				$3,477.91				$1,334.12				......	
86. Fuel for boilers			914.51				2,437.48				[4]1,033.18				......	
87. Coal for galley			......				......				......				......	
88. Water			.31				......				......				......	
89. Supplies, subsistence			360.58				1,057.03				233.52				......	
90. Supplies, engine room			83.24				97.98				35.20				......	
91. Launch supplies			10.10				100.35				4.29				......	
92. Other supplies			16.30				23.19				5.50				......	
93. Renewals of or additions to outfit			6.00				623.10				69.80				......	
94. Ordinary repairs			1,096.61				[1]11.61				32.11				......	
95. Laundry, ice, miscellaneous expenses, etc.			35.80				127.36				231.44				......	
96. Total				$3,698.45				$7,956.01				$2,978.16				......
Barges (amounts chargeable to dredge).																
97. Ordinary repairs to barges			......				......				......				......	
98. Miscellaneous expenses			......	......			......	......			113.21	113.21			......	......
99. Total field cost				$29,539.54				$87,739.70				$107,196.79				$1,723.05
100. Total field cost per cubic yard (cents).	13.9513 +				2.9				4.3				(1).			
Extra expenses.																
101. Office expenses, superintendence, surveys, etc.			[1]6,809.71				2,579.15				[5]5,706.76				$84.25	
102. Extraordinary repairs to dredge:																
(a) Hull			6,151.91				126.74				1,166.34				......	
(b) Machinery (exclusive of main dredging pump).			9,634.12				......				2,897.26				......	
103. Extraordinary repairs to towboats and launches.			......				......				107.50				......	
104. Extraordinary repairs to barges			2,030.81	24,626.55			......				......	9,877.86			......	84.25
105. Total				$54,166.09				$90,445.59				$117,074.65				$1,807.30
106. Gross cost per cubic yard (cents)	25.5822 +		16		3				4.7				(1).			

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*San Jacinto.*		*San Joaquin.*	*San Pedro.*
MISCELLANEOUS.				
107. Fule consumed by dredge, tons or barrels.	2,812.057 pounds.	15,870.18 barrels fuel oil (180 pounds per barrel).	27,442.36 barrels fuel oil.	
108. Fuel consumed by auxiliary plant, tons or barrels.	No record.	550.2 short tons coal.	11,935.5 gallons distillate, 1 to 0.095 per gallon.	
109. Total cost of all fuel.	$4,345.22.	$30,661.90.	Fuel oil $0.89 to $1.26 per barrel; distillate $9.	
110. Total water purchased (gallons).	36,354.6 gallons.		665,903 gallons.	
111. Cost of water per 1,000 gallons.	$0.77294 +.		$0.20 to $0.23.	
112. Linear feet of pipe line built during year and cost per linear foot.			16,900 feet (cost indeterminate).	
113. Average increase of depth of channel cut over.	Houston Ship Channel 12 feet; Goose Creek Channel 11 feet.	15 feet.	14.4.	
114. Maximum drdeging depth.	45 feet.	45 feet.	47 feet.	36 feet.
115. Number of shifts worked per day.	3.	3.	3.	3.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	Dredge ceased operations on Galveston district on Feb. 7, 1917. Extraordinary repairs were started Feb. 8 and completed May 31. Dredge departed from Galveston for New Orleans district on June 12, 1917. This report is for period from Jan. 1, 1917, to May 31, 1917, inclusive. [1] Includes $4,848.16 Fort Point depot charges.	[1] Gasoline.	Fuel purchased by barrel of 42 gallons, each gallon weighing approximately 7.75 pounds. [1] Also used by dredge Sacramento. [2] This figure is not the sum of those given for each month, as the yardage dredged at Mare Island Straits was measured by the navy yard and their monthly estimates were greatly modified (increased) by the final figures rendered. [3] Feet. [4] Distillate. [5] Does not include all office and survey expenses incurred by the navy yard, as complete statement of these was not furnished this office.	[1] Out of commission entire year. Pay rolls include pay of men for making minor repairs and watching dredging plant.

Name	*Sarasota.*	*Selma.*	*Shippingport.*	*Teal.*
1. District	Jacksonville, Fla	St. Louis, Mo	Louisville, Ky	Rock Island, Ill.
2. When built	1915	1897–98	1914	1911–12.
3. Where built	Tampa, Fla	Jeffersonville, Ind	Jeffersonville, Ind	Keokuk, Iowa.
4. Builder	Tampa Foundry & Machine Co.	The Bucyrus Co	Ed. J. Howard [1]	United States.
5. Time to build	6 months	10 months	2 months	About 1 year.
6. Material of hull	Steel	Steel	Steel	Wood, steel, and concrete
7. Contract cost of dredge	$20,093.98 [1]	$102,400	$5,825 (hull)	(No contract); $28,476.93.
8. (*a*) Cost of outfit; (*b*) cost of pipe line.	(*a*) $4,971.48; (*b*) $2,509.55	(*a*) $14,751.06; (*b*) not known	(*a*) $13,320.78; (*b*) $1,345.78	(*a*) included above; (*b*) $7,333.81.
9. Length	77 feet 1¼ inches, 112 feet 6 inches over all.	160 feet	100 feet	130 feet.
10. Beam	29 feet 6⅜ inches	40 feet	22 feet 8 inches	28 feet.
11. Depth	5 feet	6 feet	5 feet	5 feet.
12. Draft:				
(*a*) Forward	2 feet 4 inches	4 feet	1 foot 7 inches	2.75 feet.
(*b*) Aft	2 feet 6 inches	do	3 feet 3 inches	2.95 feet.
13. Displacement (long tons)	150	600	131	267.
14. Number of crew	10 (8-hour day)	44		19 men.
15. Number, size, and type of propelling engines.	No propelling engine			
16. Number, size, and type of pumping engines.	One 8-inch and 14-inch by 10-inch Morris compound.	Two 15-inch and 26-inch horizontal, noncondensing, cross compound, direct connected.	One 16 by 22 inch, horizontal, single cylinder.	One 13, 25 by 16 inch cross compound, condensing.
17. Cutter engines:				
(*a*) Diameter of cylinders	6¼ inches		4½ by 6 inches	
(*b*) Stroke	8 inches		6 inches	
18. Hauling engines:				
(*a*) Diameter of cylinders	6 inches	7 inches	7½ inches	8½ inches.
(*b*) Stroke	8 inches	do	10 inches	10 inches.
19. Boilers:				
(*a*) Number and type	1, Clyde	6, Mississippi River	2, Scotch marine	3, Mississippi River type.
(*b*) Length	12 feet	28 feet	10 feet 1 inch	20 feet 2½ inches.
(*c*) Diameter	7 feet 6 inches	48 inches, 5 flues, 11 inches diameter.	6 feet 6 inches	40½ inches.
(*d*) Heating surface (total)	1,150 square feet	3,925 square feet	600 square feet	1,166 square feet.
(*e*) Grate surface (total)	21 square feet	112 square feet	17½ square feet	48.75 square feet.
20. Discharge pipe in use (average number of feet).	180	300 feet	200	1,050 feet.
21. Diameter of discharge pipe	10 inches	28 inches	12 inches	18 inches.
22. Pontoons:				
(*a*) Number and material of those in use (average).	12, wood	17, steel	7, wood (Georgia pine)	21, wood and concrete.
(*b*) Dimensions	14 by 6 by 2 feet	Lozenge shape, 20 by 14 by 2½ feet.	5 by 20 by 4 feet deep	50 by 14 feet by 3 feet 4 inches.
23. Revolutions per minute of propelling engines.	No propelling engine			
24. Revolutions per minute of pumping engines.	343	135	150	238.
25. Type of agitator or cutter head	Revolving tooth	Water-jet sand agitator		

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Sarasota.*	*Selma.*	*Shippingport.*	*Taal.*
26. Diameter of cutter	3 feet		3 feet 4 inches	
27. Diameter of cutter shaft	4 inches		$3\frac{11}{16}$ inches	
28. Type of suction head	Square, with hood	Dustpan		Plain square.
29. Revolutions per minute of cutter head	24		5	
30. Average boiler pressure (gauge)	110 pounds	125 pounds	125 pounds	140 pounds.
31. Kind of coal used	Wood	Bituminous	Bituminous, run of mine	Bituminous, lump and mine run.
32. Average gauge pressure in discharge pipe.	8 pounds	4 pounds	5 pounds	18 pounds.
33. Average vacuum in suction pipe	12 inches	14 pounds	20 inches	20 inches of mercury.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge		Kaskaskia		
35. Number of crew		5		
36. Displacement		150		
37. Draft:				
(*a*) Forward		3 feet		
(*b*) Aft		3 feet 6 inches		
Launches.				
38. Name	Alafia			
39. Length	18 feet			
40. Beam	5 feet 10 inches			
41. Depth	2 feet 1 inch			
42. Draft	1 foot 8 inches			
43. Displacement	0.65 ton			
Barges.				
44. Identifying numbers of barges in use	U. S. B 5	4, 7, and 9		No. 486 and No. 497.
45. Usage	Fuel	Coal		Coal.
46. Displacement, light (each)	30 tons	150 tons		50 long tons.
47. Capacity of barges (each)	50 tons	750 tons		132 long tons.
WORK PERFORMED.				
48. Location of dredging	Sarasota Bay, Caloosahatchee River. Orange River.	See remarks		Miles 516, 559, 651, and Alton Slough.
49. Average depth before dredging	3 2.7 2.8	8.8		+2.2 to −3.9.
50. Average depth after dredging	5 5 5	12		−6.2 to −11.3.

51. Character of material dredged	Sand, 90 per cent; mud, 9 per cent; rock, 1 per cent.	Blue mud, sand, gravel and rock bowlder.		Sand, gravel, and gumbo mud.
52. Rate of advance per hour (in feet straight ahead).	19 feet	150 feet		9.55 feet.
53. Amount dredged during the year	123,289 cubic yards	97,193 cubic yards		193,549 cubic yards.
54. Total amount dredged by this dredge at this locality.	(2)	See remarks		Do.
55. Average amount dredged:				
(a) Per hour (pumping)	89 cubic yards	264.8 cubic yards		194.9 cubic yards.
(b) Per day	428 cubic yards	2,212.9 cubic yards		1,995.4 cubic yards.
56. Maximum amiunt dredged in one month.	14,860 cubic yards	55,398 cubic yards		47,294 cubic yards.
57. Total number of days upon which any dredging was done.	288	48		97.
58. Average number of working hours per working day.	4 hours 48 minutes	10 hours 36 minutes		12 hours 2 minutes.
59. Maximum number of working hours per working day.	8[2]	16		16.

DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage
60. Time at work:												
(a) Pumping	1,376	25	15.701	366	15	4.18	(3)			993		11.34
(b) Handling pipe line	106	55	1.220	15	5	.17				199	50	2.28
(c) Handling swinging wires (cleaning suction.)	42	5	.489							14	20	.16
(d) Going to and from wharf or anchorage.				6	25	.08				175	45	2.01
(e) Placing dredge	45	50	.525	101	25	1.16				15	35	.18
(f) Waiting for vessels to pass	30	30	.358	11	20	.13						
61. Time lost from work:												
(a) Changing location of plant	173		1.984	50	45	.58				105	10	1.20
(b) Bad weather				8	15	.09				3	45	.04
(c) Washing boilers and ordinary repairs.	112	40	1.299	66	40	.76				61	35	.70
(d) Extraordinary repairs										68	15	.78
(e) Other causes	5,456	35	62.264	8,053	5	91.93				6,618	45	75.56
(f) Sundays and holidays	1,416		16.160	80	45	.92				504		5.75
62. Total hours in year	8,760		100.00	8,760		100.00	8,760		100.00	8,760		100.00
63. Total time at work	1,601	45	18.293	500	30	5.70				1,398	30	15.97
64. Total time lost from work	7,158	15	81.707	8,259	30	94.30				7,361	30	84.03

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Sarasota.*		*Selma.*		*Shippingport.*		*Tual.*	
COST OF WORK.								
Dredge.								
65. Pay rolls	$6,696.57		$7,023.92		....		$8,609.56	
66. Fuel for boilers	1,677.20		2,565.96		....		4,336.82	
67. Coal for galley	49.00		48.98		....		....	
68. Water	....		....		....		....	
69. Supplies, subsistence	2,131.92		2,736.70		....		1,797.49	
70. Supplies, engine room	965.63		527.20		....		309.30	
71. Other supplies	546.58		289.98		....		1,436.66	
72. Renewals or additions to outfit	2,496.34		....		....		274.46	
73. Ordinary repairs:								
(a) Hull	81.40		....		....		24.75	
(b) Machinery (exclusive of main dredging pump).	273.19		252.02		....		125.77	
74. Laundry, ice, miscellaneous expenses	729.49		1,839.44		....		157.11	
75. Total		$15,647.62		$15,284.18		....		$17,071.92
Main dredging pump.								
76. Diameter of runner	30 inches		....		25 inches		50 inches.	
77. Volute (lined or unlined)	Unlined		....		Lined		Unlined	

	Sarasota.				*Selma.*				*Shippingport.*				*Tual.*			
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(a) Volute	......	......	$706.10		......	......	......		......	......	......		......	......		
(b) Runner	......	......	91.47		......	......	......		......	......	......		......	......	$170.00	
(c) Volute liners	......	......	......		......	......	......		......	......	......		......	......	......	
(d) Runner liners	......	......	......		......	......	......		......	......	......		......	......	......	
(e) Head and back liners	......	......	......		......	......	......		......	......	......		......	......	148.27	
79. Miscellaneous repairs	......	......	11.40		......	......	......		......	......	......		......	......	45.07	
80. Total	......	......	......	$808.97	......	......	......	......	......	......	......	......	......	......	......	$363.34

Pipe line.																
81. Renewals:																
(a) Rubber sleeves	35		312.20										12		514.00	
(b) Pipe													[1] 485		6,225.00	
(c) Pontoons	6		692.10												30.00	
(d) Outfit			30.40													
82. Repairs															29.40	
83. Miscellaneous			13.29													
84. Total				$1,047.99												$6,799.20
Towboats and launches.																
85. Pay rolls							391.67									
86. Fuel for boilers			[6] 291.43				189.70								16.50	
87. Coal for galley							131.92									
88. Water																
89. Supplies, subsistence																
90. Supplies, engine room			117.47				18.00									
91. Launch supplies															93.72	
92. Other supplies																
93. Renewals of or additions to outfit			28.07													
94. Ordinary repairs															14.00	
95. Laundry, ice, miscellaneous expenses, etc.							7.44									
96. Total				$436.97				$738.73								$124.22
Barges (amounts chargeable to dredge).																
97. Ordinary repairs to barges			68.44													
98. Miscellaneous expenses																
99. Total field cost				$18,009.99				[1] $16,016.91								$24,258.68
100. Total field cost per cubic yard (cents).	14.607				$0.165								$0.1288.			
Extra expenses.																
101. Office expenses, superintendence, surveys, etc.			$1,288.49				$5,016.40								$445.57	
102. Extraordinary repairs to dredge:																
(a) Hull			74.43													
(b) Machinery (exclusive of main dredging pump).			402.48													
103. Extraordinary repairs to towboats and launches.			52.86													
104. Extraordinary repairs to barges				529.77												
105. Total				19,828.25				21,033.31								24,704.25
106. Gross cost per cubic yard (cents)	16.082				$0.217								$0.1276.			

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Sarasota.*	*Selma.*	*Shippingport.*	*Teal.*
MISCELLANEOUS.				
107. Fuel consumed by dredge, tons or barrels.	351 cords wood	838.55 tons		1,157.74 short tons.
108. Fuel consumed by auxiliary plant, tons or barrels.	1,185 gallons gasoline	62 tons		
109. Total cost of all fuel	(4)	$2,804.72		$4,449.19; $3.842 per ton.
110. Total water purchased (gallons)				
111. Cost of water per 1,000 gallons				
112. Linear feet of pipe line built during year and cost per linear foot.				
113. Average increase of depth of channel cut over.	2 feet	4.4 feet		6.7 feet.
114. Maximum dredging depth	20 feet	15 feet	24 feet	21 feet.
115. Number of shifts worked per day	1	2	1	2.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	[1] Includes items supplied by the United States. [2] 28,313, of which 1,617 was rock; 97,881 cubic yards, 2,905 cubic yards. [3] Working on 8-hour day basis. [4] Pine wood, 109 cords, at $4; 197 cords, at $3.50, and 45 cords, at $3.75. [5] Price of gasoline was 23 to 25 cents per gallon.	Mississippi River between mouths of Ohio and Missouri Rivers: *Localities.* — *Cubic yards.* Grand Tower Landing .. 16,900 Grand Tower Crossing .. 23,900 Crawford .. 35,700 Graysboro, Winter Harbor .. 20,600 97,100 [1] Includes charges for proportional part of the expenses of care of idle plant, materials, etc.	[1] House and outfit installed by the United States. [2] Dredge not operated during the year. Machinery removed at a cost of $111.79, and hull used for transporting and storing cement.	[1] Linear feet.

Name	*Taber, H. S.*[1]	*Talcott, Capt. Andrew.*[1]	*Thebes.*
1. District	Little Rock, Ark	Washington, D. C.	St. Louis, Mo.
2. When built	1912-1914	1912	1897-98.
3. Where built	Dubuque, Iowa	Washington, N. C.	Jeffersonville, Ind.
4. Builder	Dubuque Boat & Boiler Works	Miner Engineering Co.	The Bucyrus Co.
5. Time to build	2 years 2 months	1 year	10 months.
6. Material of hull	Steel	Wood	Steel.
7. Contract cost of dredge	$160,174.24	$57,485	$102,400.
8. (*a*) Cost of outfit; (*b*) cost of pipe line.	(*a*) $4,472.92; (*b*) $22,847.13	(*a*)[2]; (*b*) $12,490.83 [3]	(*a*) $12,174.95; (*b*) Unknown.
9. Length	206 feet 9 inches over all	111 feet 8 inches	160 feet.
10. Beam	44 feet 4 inches	32 feet	40 feet.
11. Depth	7 feet	9 feet 7 inches	6 feet.
12. Draft:			
(*a*) Forward	3 feet 7 inches	6 feet 2 inches	4 feet.
(*b*) Aft	3 feet 4 inches	6 feet 9 inches	Do.
13. Displacement (long tons)	754	465	600.
14. Number of crew	42	19	
15. Number, size, and type of propelling engines.	Two 24 by 48 inch stroke, Gillette & Eaton		
16. Number, size, and type of pumping engines.	One 15, 22½ and 36 by 18 inches, condensing	14 and 28 by 18 inches fore and aft, compound.	Two 15 and 26 inches by 18 inches horizontal, noncondensing cross compound, direct connected.
17. Cutter engines:			
(*a*) Diameter of cylinders		10 inches	
(*b*) Stroke		do	
18. Hauling engines:			
(*a*) Diameter of cylinders	7 inches	8½ inches	7 inches.
(*b*) Stroke	8 inches	10 inches	Do.
19. Boilers:			
(*a*) Number and type	3 Lyons combination water and fire tube	1 Heine water tube	6 Mississippi River.
(*b*) Length	20 feet	19 feet	28 feet.
(*c*) Diameter	66 inches	14 feet	48 inches; five 11-inch flues.
(*d*) Heating surface (total)	5,184 square feet	4,722 square feet	3,925 square feet.
(*e*) Grate surface (total)	1,355 square feet	88 square feet	112 square feet.
20. Discharge pipe in use (average number of feet).	250	928.2 feet	300 feet.
21. Diameter of discharge pipe	24 inches	18 inches	28 inches.
22. Pontoons:			
(*a*) Number and material of those in use (average).	5 steel	25 Georgia pine	9 steel.
(*b*) Dimensions	47 feet 6 inches by 12 by 3 feet	18 feet 6 inches by 8 feet by 2 feet 4 inches.	Lozenge shape, 20 by 14 by 2½ feet.
23. Revolutions per minute of propelling engines.	14 (as operated)		
24. Revolutions per minute of pumping engines.	162	208	140.
25. Type of agitator or cutter head	Water jet (no cutter head)	Taylor-Wharton straight bladed.	Water-jet sand agitator.
26. Diameter of cutter		5 feet	
27. Diameter of cutter shaft		6 inches	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 19[illegible]* [illegible]

	Taber, H. S.		Talcott, Capt. Andrew.	[illegible]
Type of suction head	Dustpan		Elliptical	Dustpan.
29. Revolutions per minute of cutter head			12	
30. Average boiler pressure (gauge)	160		147	125 pounds.
31. Kind of coal used	Mine run, Arkansas semianthracite and Kentucky bituminous		Bituminous	Bituminous.
32. Average gauge pressure in discharge pipe.	5 pounds		22 pounds	2½ pounds.
33. Average vacuum in suction pipe	16 inches		17 inches	15 pounds.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge	J. C. Atlee (chartered plant)[2]	H. E. Myrtle[1]		
35. Number of crew	6	4		
36. Displacement				
37. Draft:				
(a) Forward				
(b) Aft				
Launches.				
38. Name			Averill	
39. Length			36 feet	
40. Beam			10 feet 6 inches	
41. Depth			6 feet 1 inch	
42. Draft			3 feet 5½ inches	
43. Displacement			9 tons	
Barges.				
44. Identifying numbers of barges in use	B 1, B 2, B-3, and B 4[3]	B1 14 and B4 14	1, No. 4	
45. Usage	Fuel supply	Fuel	Coal	
46. Displacement, light (each)	70 long tons	50 long tons	51 tons	
47. Capacity of barges (each)	180 long tons, maximum	200 tons	115 tons	
WORK PERFORMED.				
48. Location of dredging	Arkansas River	Missouri River, Kansas City to mouth.	Anacostia River	
49. Average depth before dredging	7.5 feet	4 feet	7.1	
50. Average depth after dredging	10 feet[4]	9 feet	10.1	
51. Character of material dredged	Sand, 92 per cent; gravel, 2.5 per cent; mud, 5.5 per cent.	Sand, mud, and gravel	Mud, 82 per cent; sand, 1 per cent, gravel, 17 per cent.	

52. Rate of advance per hour (in feet straight ahead).	166	130 feet	7 feet
53. Amount dredged during the year	175,000	414,000 cubic yards	162,406 cubic yards [4]
54. Total amount dredged by this dredge at this locality.	1,878,660	do	327,996 cubic yards [5]
55. Average amount dredged:			
(a) Per hour (pumping)	845 cubic yards	840 cubic yards	324.1 cubic yards
(b) Per day	3,888 cubic yards	7,400 cubic yards	2,633.5 cubic yards
56. Maximum amount dredged in one month.	118,800	105,000 cubic yards	59,550 cubic yards
57. Total number of days upon which any dredging was done.	25	56	63 days
58. Average number of working hours per working day.	16	14	10 hours 55 minutes
59. Maximum number of working hours per working day.	16	16	11 hours 20 minutes

DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	207			487		13.26	519	55	21			
(b) Handling pipe line	21			51		1.40	63	35	2⅓			
(c) Handling swinging wires (cleaning suction).	22			61		1.67	[6] 51	55	2			
(d) Going to and from wharf or anchorage.	13			14		.39						
(e) Placing dredge	62			72		1.97	17	5	⅔			
(f) Waiting for vessels to pass				5		.15						
61. Time lost from work:												
(a) Changing location of plant	146			331		9.00						
(b) Bad weather				30		.83						
(c) Washing boilers and ordinary repairs.	283			337		9.18	43	25	1½			
(d) Extraordinary repairs	53			600		16.33						
(e) Other causes				1,060		28.84	[7] 1,504	5	59⅓			
(f) Sundays and holidays				624		16.98	320		13			
62. Total hours in year			100.00			100.00			100.00	8,760		100.00
63. Total time at work	[5] 325		6.74—	2,928			[4] 652	30	26			
64. Total time lost from work	4,499		93.26	744			1,867	30	74	8,760		100.00

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Taber, H. S.*		*Talcott, Capt. Andrew.*	*Thebes.*
28. Type of suction head	Dustpan		Elliptical	Dustpan.
29. Revolutions per minute of cutter head			12	
30. Average boiler pressure (gauge)	160		147	125 pounds.
31. Kind of coal used	Mine run, Arkansas semianthracite and Kentucky bituminous		Bituminous	Bituminous.
32. Average gauge pressure in discharge pipe.	5 pounds		22 pounds	2½ pounds.
33. Average vacuum in suction pipe	16 inches		17 inches	15 pounds.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge	J. C. Atlee (chartered plant)[2]	H. E. Myrtle[1]		
35. Number of crew	6	4		
36. Displacement				
37. Draft:				
(*a*) Forward				
(*b*) Aft				
Launches.				
38. Name			Averill	
39. Length			36 feet	
40. Beam			10 feet 6 inches	
41. Depth			6 feet 1 inch	
42. Draft			3 feet 5½ inches	
43. Displacement			9 tons	
Barges.				
44. Identifying numbers of barges in use	B-1, B-2, B-3, and B-4[3]	B1-14 and B4-14	1, No. 4	
45. Usage	Fuel supply	Fuel	Coal	
46. Displacement, light (each)	70 long tons	50 long tons	51 tons	
47. Capacity of barges (each)	180 long tons, maximum	200 tons	115 tons	
WORK PERFORMED.				
48. Location of dredging	Arkansas River	Missouri River, Kansas City to mouth.	Anacostia River	
49. Average depth before dredging	7.5 feet	4 feet	7.1	
50. Average depth after dredging	10 feet[4]	9 feet	16.1	
51. Character of material dredged	Sand, 92 per cent; gravel, 2.5 per cent; mud, 5.5 per cent.	Sand, mud, and gravel	Mud, 82 per cent; sand, 1 per cent; gravel, 17 per cent.	

52. Rate of advance per hour (in feet straight ahead).	166			130 feet			7 feet					
53. Amount dredged during the year	175,000			414,000 cubic yards			162,406 cubic yards [4]					
54. Total amount dredged by this dredge at this locality.	1,878,660			do			327,996 cubic yards [5]					
55. Average amount dredged:												
(a) Per hour (pumping)	845 cubic yards			840 cubic yards			324.1 cubic yards					
(b) Per day	3,888 cubic yards			7,400 cubic yards			2,633.5 cubic yards					
56. Maximum amount dredged in one month.	118,800			105,000 cubic yards			59,550 cubic yards					
57. Total number of days upon which any dredging was done.	25			56			63 days					
58. Average number of working hours per working day.	16			14			10 hours 55 minutes					
59. Maximum number of working hours per working day.	16			16			11 hours 20 minutes					
DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	207			487		13.26	519	55	21			
(b) Handling pipe line	21			51		1.40	63	35	2⅓			
(c) Handling swinging wires (cleaning suction).	22			61		1.67	[6] 51	55	2			
(d) Going to and from wharf or anchorage.	13			14		.39						
(e) Placing dredge	62			72		1.97	17	5	⅔			
(f) Waiting for vessels to pass				5		.15						
61. Time lost from work:												
(a) Changing location of plant	146			331		9.00						
(b) Bad weather				30		.83						
(c) Washing boilers and ordinary repairs.	283			337		9.18	43	25	1½			
(d) Extraordinary repairs	53			600		16.33						
(e) Other causes				1,060		28.84	[7] 1,504	5	59⅓			
(f) Sundays and holidays				624		16.98	320		13			
62. Total hours in year			100.00			100.00			100.00	8,760		100.00
63. Total time at work	[5] 325		6.74—	2,928			[4] 652	30	26			
64. Total time lost from work	4,499		93.26	744			1,867	30	74	8,760		100.00

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Taber, H. S.*				*Talcott, Capt. Andrew.*		*Thebes.*	
COST OF WORK.								
Dredge.								
65. Pay rolls	$9,827.02		$11,609.85		$3,608.34		....	
66. Fuel for boilers	3,057.69		4,620.94		5,426.39		....	
67. Coal for galley	33.96		....		19.67		....	
68. Water	....		....		....		....	
69. Supplies, subsistence	2,123.70		4,083.02		941.85		....	
70. Supplies, engine room	92.90		316.77		91.03		....	
71. Other supplies	899.70		283.25		85.41		....	
72. Renewals or additions to outfit	106.00		2,209.12		1,427.48		....	
73. Ordinary repairs:								
(*a*) Hull	79.21		.90		2.78		$1,838.59	
(*b*) Machinery (exclusive of main dredging pump).	282.25		3.50		165.48		1,437.58	
74. Laundry, ice, miscellaneous expenses	121.29		235.22		44.99		....	
75. Total		$16,623.72		$23,362.57		$11,813.42		$3,276.17
Main dredging pump.								
76. Diameter of runner	69 inches		5 feet		6 feet			
77. Volute (lined or unlined)	Lined		Lined		Lined			

	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.
78. Renewals:												
(*a*) Volute	......	......	......	......	......	......	......	......	......	......	......	......
(*b*) Runner	......	......	......	......	......	......	......	......	......	......	......	......
(*c*) Volute liners	......	......	......	......	......	......	......	......	......	......	......	......
(*d*) Runner liners	......	......	......	......	......	......	......	......	......	......	......	......
(*e*) Head and back liners	......	......	......	......	......	......	......	......	......	......	......	......
79. Miscellaneous repairs	......	......	......	......	......	......	......	......	......	......	......	......
80. Total	......	......	......	......	......	......	......	......	......	......	......	......

Pipe line.																
81. Renewals:																
(a) Rubber sleeves									10	303½	$389.33					
(b) Pipe																
(c) Pontoons									[6] 30	520	3,946.50					
(d) Outfit			11.59													
82. Repairs									9	520	123.75					
83. Miscellaneous																
84. Total				11.59							4,459.58	16,273.00				
Towboats and launches.																
85. Pay rolls											161.50					
86. Fuel for boilers			$397.70													
87. Coal for galley			12.30													
88. Water																
89. Supplies, subsistence																
90. Supplies, engine room																
91. Launch supplies											115.02					
92. Other supplies																
93. Renewals of or additions to outfit																
94. Ordinary repairs																
95. Laundry, ice, miscellaneous expenses, etc.			[6] 1,924.08				[2] $3,239.00									
96. Total				$2,334.08				$3,239.00				276.52 $16,549.52				
Barges (amounts chargeable to dredge).																
97. Ordinary repairs to barges																
98. Miscellaneous expenses																
99. Total field cost				$18,969.39				$26,601.57				$16,549.52				
100. Total field cost per cubic yard (cents).	0.11+				6.42				10.19							
Extra expenses.																
101. Office expenses, superintendence, surveys, etc.			4,240.78				1,004.27				450.00				$3,501.78	
102. Extraordinary repairs to dredge:																
(a) Hull			474.82													
(b) Machinery (exclusive of main dredging pump).			130.20								823.66				7,712.01	
103. Extraordinary repairs to towboats and launches.																
104. Extraordinary repairs to barges				4,845.80				1,004.27				1,273.66				
105. Total				$23,815.19				$27,605.84				$17,823.18				$14,489.96
106. Gross cost per cubic yard (cents)	0.14+				6.67				10.97							

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Taber, H. S.*		*Talcott.*	*Thebes.*
MISCELLANEOUS.				
107. Fuel consumed by dredge, tons	728 short tons	1,194 short tons	693	
108. Fuel consumed by auxiliary plant, tons or barrels.	100 short tons		9 barrels of 50 gallons each	
109. Total cost of all fuel	$3,501.65	$2 to $4.25	$5,549.33	
110. Total water purchased (gallons)				
111. Cost of water per 1,000 gallons				
112. Linear feet of pipe line built during year and cost per linear foot.				
113. Average increase of depth of channel cut over.	2.5 feet [4]	5 feet	9 feet	
114. Maximum dredging depth	14 feet	14 feet	35 feet	15 feet.
115. Number of shifts worked per day	2	2	1	2.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	Labor cost of work done by crew on operating main dredging pump, pipe line, and barge not separable. [1] Transferred to Kansas City, Mo. [2] Additional towing and survey service in connection with these operations were: Snagboat Quapaw, 15 days; hired boat, J. C. Atlee, 31 days, and hired boat, Wolverine, 1 hour each on Jan. 6 and 8. Charter rate for Atlee included everything except fuel. The cost to the work of the other boats is included in item 95, one-half to dredge Taber and one-half to dredge McGregor. [3] These barges used by both dredges McGregor and Taber. Coal was also obtained in coal company barges. [4] 1 day after dredging. [5] Last day for Little Rock dis-	No record of separate labor cost of work done by crew on operation of main dredging pump, pipe line, and barges. [1] Hired towboat. [2] Hired boat.	[1] This dredge was formally accepted by the Government on Sept. 18, 1917, at the conclusion of a 3-months' test run. While received in good condition as regards hull and machinery, very thorough overhauling and repair is required to place the dredge in first-class operating condition. When brought to this district the dredge had been laid up for 15 months and was deficient in equipment. [2] Unknown. The Albany engineer office reports that in order to put the dredge in local working condition $25,000 was spent for a larger boiler and manganese steel cutter pump, suction and discharge pipe, complete equipment, pontoons, pipe line, etc. [3] The pontoon and shore pipe received with dredge has been valued by this office and included with the cost of pontons	Not in commission during year.

trict was July 20, 1917; after that date in charge of Kansas City office.

[3] Cost of chartered towboat and towing charges.

built and sleeves purchased in Washington.

[4] For total period from Sept. 18, 1917, to Dec. 31, 1917, as dredge was purchased on Sept. 18, 1917.

[5] For period from June 18 to Dec. 31, 1917, dredge was under charter during trial run from June 18 to Sept. 17, 1917, inclusive.

[6] Includes 12 hours and 45 minutes cleaning machinery and fires at close of working day.

[7] Includes 25 hours 25 minutes embankment repairs; 4 hours and 25 minutes removing logs and snags, 884 hours and 40 minutes idle time, only 1 crew employed, and 589 hours and 35 minutes dredge out of commission for overhauling and repairs.

[8] Built.

[9] Subsistence furnished on dredge, cost included in item 69.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Sarasota.*				*Selma.*				*Shippingport.*				*Tual.*			
COST OF WORK.																
Dredge.																
65. Pay rolls			$6,696.57				$7,023.92								$8,609.56	
66. Fuel for boilers			1,677.20				2,565.96								4,336.82	
67. Coal for galley			49.00				48.98									
68. Water																
69. Supplies, subsistence			2,131.92				2,736.70								1,797.49	
70. Supplies, engine room			965.63				527.20								309.30	
71. Other supplies			546.58				289.98								1,436.66	
72. Renewals or additions to outfit			2,496.84												274.46	
73. Ordinary repairs:																
(*a*) Hull			81.40												24.75	
(*b*) Machinery (exclusive of main dredging pump).			273.19				252.02								125.77	
74. Laundry, ice, miscellaneous expenses			729.49				1,839.44								157.11	
75. Total				$15,647.62				$15,284.18								$17,071.92
Main dredging pump.																
76. Diameter of runner	30 inches								25 inches				50 inches.			
77. Volute (lined or unlined)	Unlined								Lined				Unlined			
	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(*a*) Volute			$706.10													
(*b*) Runner			91.47												$70.00	
(*c*) Volute liners																
(*d*) Runner liners																
(*e*) Head and back liners															148.27	
79. Miscellaneous repairs			11.40												48.07	
80. Total				$808.97												$263.34

Pipe line.																
81. Renewals:																
(a) Rubber sleeves	35		312.20										12		514.00	
(b) Pipe													1 485		6,225.00	
(c) Pontoons	6		692.10												30.00	
(d) Outfit			30.40													
82. Repairs															29.40	
83. Miscellaneous			13.29													
84. Total				$1,047.99												$6,799.20
Towboats and launches.																
85. Pay rolls							390.67									
86. Fuel for boilers			291.43				184.70								16.50	
87. Coal for galley							131.92									
88. Water																
89. Supplies, subsistence																
90. Supplies, engine room			117.47				18.00									
91. Launch supplies															93.72	
92. Other supplies																
93. Renewals of or additions to outfit			28.07													
94. Ordinary repairs															14.00	
95. Laundry, ice, miscellaneous expenses, etc.							7.44									
96. Total				$436.97				$732.73								$124.22
Barges (amounts chargeable to dredge).																
97. Ordinary repairs to barges			68.44													
98. Miscellaneous expenses																
99. Total field cost				$18,009.99				[1] $16,016.91								$24,258.68
100. Total field cost per cubic yard (cents).	14.607				$0.165								$0.1253.			
Extra expenses.																
101. Office expenses, superintendence, surveys, etc.			$1,288.49				$5,016.40								$445.57	
102. Extraordinary repairs to dredge:																
(a) Hull			74.43													
(b) Machinery (exclusive of main dredging pump).			402.48													
103. Extraordinary repairs to towboats and launches.			52.86													
104. Extraordinary repairs to barges				529.77												
105. Total				19,828.25				21,033.31								24,704.25
106. Gross cost per cubic yard (cents)	16.082				$0.217								$0.1276.			

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Sarasota.*	*Selma.*	*Shippingport.*	*Teal.*
MISCELLANEOUS.				
107. Fuel consumed by dredge, tons or barrels.	351 cords wood	838.55 tons		1,157.74 short tons.
108. Fuel consumed by auxiliary plant, tons or barrels.	1,185 gallons gasoline	62 tons		
109. Total cost of all fuel	(4)	$2,804.72		$4,449.19; $3.842 per ton.
110. Total water purchased (gallons)				
111. Cost of water per 1,000 gallons				
112. Linear feet of pipe line built during year and cost per linear foot.				
113. Average increase of depth of channel cut over.	2 feet	4.4 feet		6.7 feet.
114. Maximum dredging depth	20 feet	15 feet	24 feet	21 feet.
115. Number of shifts worked per day	1	2	1	2.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	[1] Includes items supplied by the United States. [2] 28,313, of which 1,617 was rock; 97,881 cubic yards, 2,905 cubic yards. [3] Working on 8-hour day basis. [4] Pine wood, 109 cords, at $4; 197 cords, at $3.50, and 45 cords, at $3.75. [5] Price of gasoline was 23 to 25 cents per gallon.	Mississippi River between mouths of Ohio and Missouri Rivers: *Localities.* — *Cubic yards.* Grand Tower Landing.. 16,900 Grand Tower Crossing.. 23,900 Crawford.... 35,700 Graysboro, Winter Harbor.... 20,600 97,100 [1] Includes charges for proportional part of the expenses of care of idle plant, materials, etc.	[1] House and outfit installed by the United States. [2] Dredge not operated during the year. Machinery removed at a cost of $111.79, and hull used for transporting and storing cement.	[1] Linear feet.

Name	*Taber, H. S.*[1]	*Talcott, Capt. Andrew.*[1]	*Thebes.*
1. District	Little Rock, Ark	Washington, D. C.	St. Louis, Mo.
2. When built	1912–1914	1912	1897–98.
3. Where built	Dubuque, Iowa	Washington, N. C.	Jeffersonville, Ind.
4. Builder	Dubuque Boat & Boiler Works	Miner Engineering Co	The Bucyrus Co.
5. Time to build	2 years 2 months	1 year	10 months.
6. Material of hull	Steel	Wood	Steel.
7. Contract cost of dredge	$160,174.24	$57,485	$102,400.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) $4,472.92; (*b*) $22,847.13	(*a*)[2]; (*b*) $12,490.83[3]	(*a*) $12,174.95; (*b*) Unknown.
9. Length	206 feet 9 inches over all	111 feet 8 inches	160 feet.
10. Beam	44 feet 4 inches	32 feet	40 feet.
11. Depth	7 feet	9 feet 7 inches	6 feet.
12. Draft:			
(*a*) Forward	3 feet 7 inches	6 feet 2 inches	4 feet.
(*b*) Aft	3 feet 4 inches	6 feet 9 inches	Do.
13. Displacement (long tons)	754	465	600.
14. Number of crew	42	19	
15. Number, size, and type of propelling engines.	Two 24 by 48 inch stroke, Gillette & Eaton		
16. Number, size, and type of pumping engines.	One 15, 22½ and 36 by 18 inches, condensing	14 and 28 by 18 inches fore and aft, compound.	Two 15 and 28 inches by 18 inches horizontal, noncondensing cross compound, direct connected.
17. Cutter engines:			
(*a*) Diameter of cylinders		10 inches	
(*b*) Stroke		do	
18. Hauling engines:			
(*a*) Diameter of cylinders	7 inches	8½ inches	7 inches.
(*b*) Stroke	8 inches	10 inches	Do.
19. Boilers:			
(*a*) Number and type	3 Lyons combination water and fire tube	1 Heine water tube	6 Mississippi River.
(*b*) Length	20 feet	19 feet	28 feet.
(*c*) Diameter	66 inches	14 feet	48 inches; five 11-inch flues.
(*d*) Heating surface (total)	5,184 square feet	4,722 square feet	3,925 square feet.
(*e*) Grate surface (total)	1,355 square feet	88 square feet	112 square feet.
20. Discharge pipe in use (average number of feet).	250	928.2 feet	300 feet.
21. Diameter of discharge pipe	24 inches	18 inches	28 inches.
22. Pontoons:			
(*a*) Number and material of those in use (average).	5 steel	25 Georgia pine	9 steel.
(*b*) Dimensions	47 feet 6 inches by 12 by 3 feet	18 feet 6 inches by 8 feet by 2 feet 4 inches.	Lozenge shape, 20 by 14 by 2½ feet.
23. Revolutions per minute of propelling engines.	14 (as operated)		
24. Revolutions per minute of pumping engines.	162	208	140.
25. Type of agitator or cutter head	Water jet (no cutter head)	Taylor-Wharton straight bladed	Water-jet sand agitator.
26. Diameter of cutter		5 feet	
27. Diameter of cutter shaft		6 inches	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Taber, H. S.*		*Talcott, Capt. Andrew.*	*Thebes.*
28. Type of suction head	Dustpan		Elliptical	Dustpan.
29. Revolutions per minute of cutter head			12	
30. Average boiler pressure (gauge)	160		147	125 pounds.
31. Kind of coal used	Mine run, Arkansas semianthracite and Kentucky bituminous		Bituminous	Bituminous.
32. Average gauge pressure in discharge pipe.	5 pounds		22 pounds	2½ pounds.
33. Average vacuum in suction pipe	16 inches		17 inches	15 pounds.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge	J. C. Atlee (chartered plant) [2]	H. E. Myrtle [1]		
35. Number of crew	6	4		
36. Displacement				
37. Draft:				
(a) Forward				
(b) Aft				
Launches.				
38. Name			Averill	
39. Length			36 feet	
40. Beam			10 feet 6 inches	
41. Depth			6 feet 1 inch	
42. Draft			3 feet 5½ inches	
43. Displacement			9 tons	
Barges.				
44. Identifying numbers of barges in use	B-1, B-2, B-3, and B-4 [3]	B1-14 and B4-14	1, No. 4	
45. Usage	Fuel supply	Fuel	Coal	
46. Displacement, light (each)	70 long tons	50 long tons	51 tons	
47. Capacity of barges (each)	180 long tons, maximum	200 tons	115 tons	
WORK PERFORMED.				
48. Location of dredging	Arkansas River	Missouri River, Kansas City to mouth.	Anacostia River	
49. Average depth before dredging	7.5 feet	4 feet	7.1	
50. Average depth after dredging	10 feet [4]	9 feet	16.1	
51. Character of material dredged	Sand, 92 per cent; gravel, 2.5 per cent; mud, 5.5 per cent.	Sand, mud, and gravel	Mud, 82 per cent; sand, 1 per cent; gravel, 17 per cent.	

52. Rate of advance per hour (in feet straight ahead).	166			130 feet			7 feet					
53. Amount dredged during the year	175,000			414,000 cubic yards			162,406 cubic yards [4]					
54. Total amount dredged by this dredge at this locality.	1,878,660			do			327,996 cubic yards [5]					
55. Average amount dredged:												
(a) Per hour (pumping)	845 cubic yards			840 cubic yards			324.1 cubic yards					
(b) Per day	3,888 cubic yards			7,400 cubic yards			2,633.5 cubic yards					
56. Maximum amount dredged in one month.	118,800			105,000 cubic yards			59,550 cubic yards					
57. Total number of days upon which any dredging was done.	25			56			63 days					
58. Average number of working hours per working day.	16			14			10 hours 55 minutes					
59. Maximum number of working hours per working day.	16			16			11 hours 20 minutes					
DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping	207			487		13.26	519	55	21			
(b) Handling pipe line	21			51		1.40	63	35	2½			
(c) Handling swinging wires (cleaning suction).	22			61		1.67	[6] 51	55	2			
(d) Going to and from wharf or anchorage.	13			14		.39						
(e) Placing dredge	62			72		1.97	17	5	⅔			
(f) Waiting for vessels to pass				5		.15						
61. Time lost from work:												
(a) Changing location of plant	146			331		9.00						
(b) Bad weather				30		.83						
(c) Washing boilers and ordinary repairs.	283			337		9.18	43	25	1½			
(d) Extraordinary repairs	53			600		16.33						
(e) Other causes				1,060		28.84	[7] 1,504	5	59⅓			
(f) Sundays and holidays				624		16.98	320		13			
62. Total hours in year			100.00			100.00			100.00	8,760		100.00
63. Total time at work	[5] 325		6.74—	2,928			[4] 652	30	26			
64. Total time lost from work	4,499		93.26	744			1,867	30	74	8,760		100.00

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Taber, H. S.*		*Talcott, Capt. Andrew.*		*Thebes.*	
COST OF WORK.						
Dredge.						
65. Pay rolls	$9,827.02		$11,609.85		$3,608.34	
66. Fuel for boilers	3,057.69		4,620.94		5,426.39	
67. Coal for galley	33.96		....		19.67	
68. Water	....		....		....	
69. Supplies, subsistence	2,123.70		4,083.02		941.85	
70. Supplies, engine room	92.90		316.77		91.03	
71. Other supplies	899.70		283.25		85.41	
72. Renewals or additions to outfit	106.00		2,209.12		1,427.48	
73. Ordinary repairs:						
(a) Hull	79.21		.90		2.78	
(b) Machinery (exclusive of main dredging pump).	282.25		3.50		165.48	
74. Laundry, ice, miscellaneous expenses	121.29		235.22		44.99	
75. Total		$16,623.72		$23,362.57		$11,813.42
Main dredging pump.						
76. Diameter of runner	69 inches		5 feet		6 feet	
77. Volute (lined or unlined)	Lined		Lined		Lined	

	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.
78. Renewals:												
(a) Volute	......	......	......	......	......	......	......	......	......	......	......	......
(b) Runner	......	......	......	......	......	......	......	......	......	......	......	......
(c) Volute liners	......	......	......	......	......	......	......	......	......	......	......	......
(d) Runner liners	......	......	......	......	......	......	......	......	......	......	......	......
(e) Head and back liners	......	......	......	......	......	......	......	......	......	......	......	......
79. Miscellaneous repairs	......	......	......	......	......	......	......	......	......	......	......	......
80. Total	......	......	......	......	......	......	......	......	......	......	......	......

Pipe line.																
81. Renewals:																
(a) Rubber sleeves									10	303½	$389.33					
(b) Pipe																
(c) Pontoons									[5] 30	520	3,946.50					
(d) Outfit			11.59													
82. Repairs									9	520	123.75					
83. Miscellaneous																
84. Total				11.59							4,459.58	16,273.00				
Towboats and launches.																
85. Pay rolls											161.50					
86. Fuel for boilers			$397.70													
87. Coal for galley			12.30													
88. Water																
89. Supplies, subsistence																
90. Supplies, engine room																
91. Launch supplies											115.02					
92. Other supplies																
93. Renewals of or additions to outfit																
94. Ordinary repairs																
95. Laundry, ice, miscellaneous expenses, etc.			[5] 1,924.08				[2] $3,239.00									
96. Total				$2,334.08				$3,239.00				276.52 $16,549.52				
Barges (amounts chargeable to dredge).																
97. Ordinary repairs to barges																
98. Miscellaneous expenses																
99. Total field cost				$18,969.39				$26,601.57				$16,549.52				
100. Total field cost per cubic yard (cents).	0.11+				6.42				10.19							
Extra expenses.																
101. Office expenses, superintendence, surveys, etc.			4,240.78				1,004.27				450.00				$3,501.78	
102. Extraordinary repairs to dredge:																
(a) Hull			474.82													
(b) Machinery (exclusive of main dredging pump).			130.20								823.66				7,712.01	
103. Extraordinary repairs to towboats and launches.																
104. Extraordinary repairs to barges				4,845.80				1,004.27				1,273.66				
105. Total				$23,815.19				$27,605.84				$17,823.18				$14,489.96
106. Gross cost per cubic yard (cents)	0.14+				6.67				10.97							

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Taber, H. S.*		*Talcott.*	*Thebes.*
MISCELLANEOUS.				
107. Fuel consumed by dredge, tons	728 short tons	1,194 short tons	693	
108. Fuel consumed by auxiliary plant, tons or barrels.	100 short tons		9 barrels of 50 gallons each	
109. Total cost of all fuel	$3,501.65	$2 to $4.25	$5,549.33	
110. Total water purchased (gallons)				
111. Cost of water per 1,000 gallons				
112. Linear feet of pipe line built during year and cost per linear foot.				
113. Average increase of depth of channel cut over.	2.5 feet [4]	5 feet	9 feet	
114. Maximum dredging depth	14 feet	14 feet	35 feet	15 feet.
115. Number of shifts worked per day	2	2	1	2.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	Labor cost of work done by crew on operating main dredging pump, pipe line, and barge not separable. [1] Transferred to Kansas City, Mo. [2] Additional towing and survey service in connection with these operations were: Snagboat Quapaw, 15 days; hired boat, J. C. Atlee, 31 days, and hired boat, Wolverine, 1 hour each on Jan. 6 and 8. Charter rate for Atlee included everything except fuel. The cost to the work of the other boats is included in item 95, one-half to dredge Taber and one-half to dredge McGregor. [3] These barges used by both dredges McGregor and Taber. Coal was also obtained in coal company barges. [4] 1 day after dredging. [5] Last day for Little Rock dis-	No record of separate labor cost of work done by crew on operation of main dredging pump, pipe line, and barges. [1] Hired towboat. [2] Hired boat.	[1] This dredge was formally accepted by the Government on Sept. 18, 1917, at the conclusion of a 3-months' test run. While received in good condition as regards hull and machinery, very thorough overhauling and repair is required to place the dredge in first-class operating condition. When brought to this district the dredge had been laid up for 15 months and was deficient in equipment. [2] Unknown. The Albany engineer office reports that in order to put the dredge in local working condition $25,000 was spent for a larger boiler and manganese steel cutter pump, suction and discharge pipe, complete equipment, pontoons, pipe line, etc. [3] The pontoon and shore pipe received with dredge has been valued by this office and included with the cost of pontons	Not in commission during year.

trict was July 20, 1917; after that date in charge of Kansas City office.

[6] Cost of chartered towboat and towing-charges.

built and sleeves purchased in Washington.

[4] For total period from Sept. 18, 1917, to Dec. 31, 1917, as dredge was purchased on Sept. 18, 1917.

[5] For period from June 18 to Dec. 31, 1917, dredge was under charter during trial run from June 18 to Sept. 17, 1917, inclusive.

[6] Includes 12 hours and 45 minutes cleaning machinery and fires at close of working day.

[7] Includes 25 hours 25 minutes embankment repairs; 4 hours and 25 minutes removing logs and snags, 884 hours and 40 minutes idle time, only 1 crew employed, and 589 hours and 35 minutes dredge out of commission for overhauling and repairs.

[8] Built.

[9] Subsistence furnished on dredge, cost included in item 69.

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name.	*The Ram.*	*Vesuvius.*	*Wahalak.*	*Wahkiakum.*
1. District	Fourth, Mississippi River	Rock Island, Ill	Mobile, Ala	Second, Portland, Oreg.
2. When built	1893, new steel hull in 1900	1909	1910	1913.
3. Where built	Jeffersonville, Ind.; new hull, Grafton.	Fountain City, Wis	Baltimore, Md	Portland, Oreg.
4. Builder	Bucyrus Steam Shovel & Dredge Co.	United States	Ellicott Machine Corporation	Portland Iron Works.
5. Time to build	8 months	1 year	8 months	17 months.
6. Material of hull	Steel	Wood	Steel	Steel.
7. Contract cost of dredge	$69,500; steel hull, $14,650	$29,720.78 (no contract)	$159,000 [1]; $161,039.86 [2]	$174,236.50 [1].
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) Included in contract cost	(*a*) Included above; (*b*) $3,036.32	(*a*) $1,905.98; (*b*) $18,981.25	(*a*) $8,108.25; (*b*) $27,341. [2]
9. Length	125 feet	114.8 feet	150 feet	193 feet 1½ inches.
10. Beam	30 feet	30 feet	40 feet	39 feet (hull proper, 38 feet).
11. Depth	7 feet 6 inches	5 feet	11 feet 6 inches	9 feet 6 inches.
12. Draft:				
(*a*) Forward	3 feet 6 inches	2.5 feet	6 feet	6 feet 6 inches.
(*b*) Aft	4 feet 2 inches	2.7 feet	do	5 feet 8 inches.
13. Displacement (long tons)	419	218	886	1,135.
14. Number of crew	Single 16, double 28	19 men	42	48.
15. Number, size, and type of propelling engines.	Two 15 by 54 inch noncondensing.			
16. Number, size, and type of pumping engines.	One 14-inch and 28 by 20 inch, compound condensing.	One 12 and 24 by 14 inch cross compound, condensing.	1, triple expansion, 14, 22½, and 40 by 20.	One 19, 30, 35, and 35 by 16 inches. 4-cylinder triple expansion angle engine.
17. Cutter engines:				
(*a*) Diameter of cylinders	8 inches		11 inches	8-inch and 16-inch double cylinder tandem.
(*b*) Stroke	do		14 inches	12 inches.
18. Hauling engines:				
(*a*) Diameter of cylinders	10 inches	5 inches	8½ inches	9 inches.
(*b*) Stroke	14 inches	7 inches	12 inches	12 inches.
19. Boilers:				
(*a*) Number and type	2 gunboat	2 Bonson	4 Scotch marine	4: Hawkes marine.
(*b*) Length	17 feet 1 inch	16 feet	10 feet 6 inches	13 feet 11 inches, length of drum or shell.
(*c*) Diameter	5 feet	60 inches	11 feet 4 inches	78 inches.
(*d*) Heating surface (total)	1,060 square feet	2,415.76 square feet	4,752 square feet	9,120 square feet.
(*e*) Grate surface (total)	31 square feet	50.62 square feet	150.8 square feet	208 square feet.
20. Discharge pipe in use (average number	75	600	1,500	1,750.
21. Diameter of discharge pipe	16 inches	17 inches	20 inches	24 inches inside diameter.
22. Pontoons:				
(*a*) Number and material of those in use (average).	4	12; wood	58; wood	53; wood.

(b) Dimensions	18 by 5 by 3 feet	49 by 12 feet by 2 feet 6 inches	25 feet 4 inches by 4 feet 8 inches by 5 feet, and 24 feet 8 inches by 4 feet 6 inches by 4 feet 1 inch.	by 2 feet 5 inches.
23. Revolutions per minute of propelling engines.	18			Nonpropelling.
24. Revolutions per minute of pumping engines.	120	228	145	190 to 215.
25. Type of agitator or cutter head	Ellicott		Ellicott spiral	Spiral.
26. Diameter of cutter	4 feet 4 inches		6 feet 1 inch (over blades)	7 feet 1½ inches over all.
27. Diameter of cutter shaft	5 inches		7 inches (increased to 8⅜ inches at cutter).	7¾ inches.
28. Type of suction head	Interior of cutter	Plain square	Ellicott cast steel	Open elliptical.
29. Revolutions per minute of cutter head	25 (average)		12	7.
30. Average boiler pressure (gauge)	140 pounds	148 pounds	170 pounds	195 pounds.
31. Kind of coal used	Bituminous	Bituminous lump and mine run	Bituminous	Hogged wood.
32. Average gauge pressure in discharge pipe.	17 pounds	14 pounds	29 pounds	21 pounds.
33. Average vacuum in suction pipe	20 inches	17½ inches of mercury	9 inches	16 inches.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge			Horace Harding	J. C. Post.
35. Number of crew			9	4.
36. Displacement			215 tons	95 tons.
37. Draft:				
(a) Forward			6 feet 4 inches	6 feet 5 inches
(b) Aft			8 feet 2 inches	7 feet.
Launches.				
38. Name				
39. Length				
40. Beam				
41. Depth				
42. Draft				
43. Displacement				
Barges.				
44. Identifying numbers of barges in use	1 No. 65	No. 263 and No. 264	E and K	1, 2, 3, and 8.
45. Usage	Fuel	Coal	Coal and water and shifting anchors.	Barging fuel.
46. Displacement, light (each)	98 tons	32 long tons	104 and 12 tons	118 tons.
47. Capacity of barges each	400 tons	90 long tons	340 and 42 tons	400 tons.

TABLE 15.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*The Ram.*	*Vesuvius.*	*Wahalak.*		*Wahkiakum.*
			Mobile Harbor. Ala.	Pascagoula River, Miss.	
WORK PERFORMED.					
48. Location of dredging	Mouth Red River	Miles 113, 115, 116, 154, 156 and 173.			Lower Columbia River.
49. Average depth before dredging	13 feet	2.9 to 4.08 feet	24.9 feet	4.4 feet	25.4 feet.
50. Average depth after dredging	34 feet	8.35 to 10.2 feet	30.7 feet	16.4 feet	31.3 feet.
51. Character of material dredged	Gravel, sand, silt	Sand	Clay, mud, sand, and shells		Sand; small per cent of gravel.
52. Rate of advance per hour (in feet straight ahead).	4 feet 9 inches	13.8	9.77		11.48.
53. Amount dredged during the year	147,398 cubic yards	328,167 cubic yards	2,428,162.5 cubic yards. Within theoretical section.[3]		2,161,320 cubic yards.
54. Total amount dredged by this dredge at this locality.	861,676 cubic yards	328,167 cubic yards	2,597,116.5 cubic yards. During calendar year 1917.[4]		7,985,798 cubic yards.
55. Average amount dredged:					
(a) Per hour (pumping)	183.3 cubic yards	307.4 cubic yards	689.06 cubic yards		612.12 cubic yards.
(b) Per day	2,377.4 cubic yards	3,314.8 cubic yards	11,087.50 cubic yards		11,198 cubic yards.
56. Maximum amount dredged in one month.	57,067 cubic yards	97,786 cubic yards	412,632.5 cubic yards		320,940 cubic yards.
57. Total number of days upon which any dredging was done.	62	99	219		193.
58. Average number of working hours per working day.	13	13 hours 38 minutes	19.67		20.17.
59. Maximum number of working hours per working day.	16	16	24		24.

DISTRIBUTION OF TIME.	*The Ram.* Hours.	Minutes.	Percentage.	*Vesuvius.* Hours.	Minutes.	Percentage.	*Wahalak.* Hours.	Minutes.	Percentage.	*Wahkiakum.* Hours.	Minutes.	Percentage.
60. Time of work:												
(a) Pumping	804	30	9.18	1,067	25	12.19	3,523	54	40.23	3,530	50	40.31
(b) Handling pipe line				211		2.41	464	10	5.30	250	25	2.86
(c) Handling swinging wires (cleaning suction).	44	15	.50	26	30	.30	311	22	3.55	90	20	1.03
(d) Going to and from wharf or anchorage.	282	15	3.22	46	45	.53						
(e) Placing dredge	10	30	.11	101	5	1.15				4	10	.05
(f) Waiting for vessels to pass				33	15	.38	7	40	.09	18	45	.21

61. Time lost from work:												
(a) Changing location of plant	....	....	....	215	....	2.46	165	10	1.88	174	15	1.99
(b) Bad weather	3	30	.05	31	....	.35	309	42	3.54	141	35	1.62
(c) Washing boilers and ordinary repairs.	151	....	1.73	13	....	.15	792	2	9.04	317	50	3.63
(d) Extraordinary repairs	....	....	....	20	....	.23	776	40	8.87	2,569	35	29.33
(e) Other causes	[1] 7,248	30	82.74	6,491	....	74.10	[5] 861	20	9.83	238	15	2.72
(f) Sundays and holidays	216	....	2.47	504	....	5.75	1,548	....	17.67	1,424	....	16.25
62. Total hours in year	8,760	....	100.00	8,760	....	100.00	8,760	....	100.00	8,760	....	100.00
63. Total time at work	1,141	30	....	1,486	....	16.96	4,307	6	49.17	3,894	30	44.46
64. Total time lost from work	7,619	....	....	7,274	....	83.04	4,452	54	50.83	4,865	30	55.54
COST OF WORK.												
Dredge.												
65. Pay rolls		$3,418.26			$7,191.16			$26,657.93			$31,806.31	
66. Fuel for boilers		1,742.40			3,999.76			[6] 19,731.79			[3] 4,968.47	
67. Coal for galley		9.60			....			[6] 154.78			176.40	
68. Water		....			....			183.20			[4] 7.50	
69. Supplies, subsistence		1,104.60			1,581.50			8,529.39			8,347.22	
70. Supplies, engine room		96.00			390.52			1,962.32			1,291.41	
71. Other supplies		15.30			99.08			1,682.20			1,238.52	
72. Renewals or additions to outfit		....			189.06			6,025.29			3,022.82	
73. Ordinary repairs:												
(a) Hull		51.00			....			939.88			164.95	
(b) Machinery (exclusive of main dredging pump).		3,754.00			209.20			3,623.71			1,170.08	
74. Laundry, ice, miscellaneous expenses.		45.20			105.49			464.06			447.03	
75. Total			$10,236.36			$13,765.77			$69,954.55			$52,640.71
Main dredging pump.												
76. Diameter of runner	50 inches			50 inches			96 inches			6 feet 4 inches.		
77. Volute (lined or unlined)	Lined			Unlined			Unlined			Lined.		

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*The Ram.*				*Vesuvius.*				*Wahalak.*				*Wahkiakum.*			
Main dredging pump—Continued. COST OF WORK—continued.	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:																
(*a*) Volute	......	......	......		......	......	$346.00		......	......	......		[5] 1	(9)	$984.90	
(*b*) Runner	......	......	......		......	......	142.00		......	......	......		[5] 1	2,239	837.78	
(*c*) Volute liners	......	......	......		......	......	......		......	......	......		[5] 42	80– 1,895	1,375.52	
(*d*) Runner lines	......	......	......		......	......	......		......	......	......		......	......	......	
(*e*) Head and back liners	......	......	......		......	......	......		......	......	......		[5] 54	121– 4,820	966.48	
79. Miscellaneous repairs	......	......	......		......	......	......		......	......	$67.80		......	......	199.74	
80. Total	......	......	......	......	......	......	......	$488.00	......	......	......	$67.80	......	......	......	$4,364.42
Pipe line.																
81. Renewals:																
(*a*) Rubber sleeves	......	......	......		6	......	325.50		141	(7)	4,393.42		[5] 11	605– 4,800	627.86	
(*b*) Pipe	......	......	......		......	......	......		......	......	......		......	......	......	
(*c*) Pontoon	......	......	......		......	......	......		18	......	4,052.45		......	......	......	
(*d*) Outfit	......	......	......		......	......	......		......	......	398.56		......	......	......	
82. Repairs	......	......	......		......	......	......		......	......	3,591.60		......	......	344.42	
83. Miscellaneous	......	......	......		......	......	8.10		......	......	500.25		......	......	122.17	
84. Total	......	......	......	......	......	......	......	$333.60	......	......	......	$12,936.28	......	......	......	$1,094.45
Towboats and launches.																
85. Pay rolls			......				$627.39				$5,308.86				$8,457.83	
86. Fuel for boilers			......				......				2,673.44				1,747.04	
87. Coal for galley			......				......				37.24				(7)	
88. Water			......				......				8.75				(7)	
89. Supplies, subsistence			......				......				1,840.91				(7)	
90. Supplies, engine room			......				6.75				204.09				(7)	
91. Launch supplies			......				106.77				......				......	
92. Other supplies			......				16.65				90.49				94.06	

93. Renewals of or additions to outfit	....		....		25.83		32.72	
94. Ordinary repairs	....		71.31		365.77		22.83	
95. Laundry, ice, miscellaneous expenses, etc.	....		....		3,437.46		....	
96 Total		....		828.87		14,052.87		5,355.38
Barges (amounts chargeable to dredge).								
97. Ordinary repairs to barges	....		....		....		28.90	
98. Miscellaneous expenses	....		....		5.75		....	28.90
99. Total field cost		$10,236.36		$15,416.24		$97,017.25		$63,483.86
100. Total field cost per cubic yard (cents).	6.931		4.7		3.996		2.94.	
Extra expenses.								
101. Office expenses, superintendence, surveys, etc.	$870.16		408.32		4,765.94		9,941.16	
102. Extraordinary repairs to dredge:								
(*a*) Hull	....		....		2,565.53		1,017.12	
(*b*) Machinery (exclusive of main dredging pump).	....		....		6,168.07		820.57	
103. Extraordinary repairs to towboats and launches.	....		....		642.33		207.42	
104. Extraordinary repairs to barges	....		....		138.89	14,208.76	236.69	12,222.96
105. Total		$870.16		$15,824.56		$111,298.01		$75,706.82
106. Gross cost per cubic yard (cents)	7.53		4.82		4.584		3.50.	
MISCELLANEOUS.								
107. Fuel consumed by dredge, tons or barrels.	363 short tons		757.20 short tons		5,862.20 short tons		1,648,361 cubic feet hogged wood.	
108. Fuel consumed by auxiliary plant, tons or barrels.					777.40 short tons		1,454.26 barrels oil.	
109. Total cost of all fuel	$1,742.40		$3,213.56; $4.244 per ton		$22,597.25		$6,891.91.	
110. Total water purchased (gallons)					1,338,443 gallons		Unknown.	
111. Cost of water per 1,000 gallons					Flat rate		(4).	
112. Linear feet of pipe line built during year and cost per linear foot.								
113. Average increase of depth of channel cut over.	14 feet		5.3 feet		5.6 feet, Mobile; 12 feet, Pascagoula.		5 feet.	
114. Maximum dredging depth	17 feet		21 feet		45 feet		55 feet.	
115. Number of shifts worked per day	2		2		3		3.	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*The Ram.*	*Vesuvius.*	*Wahalak.*	*Wahkiakum.*
	Remarks.		*Remarks.*	*Remarks.*
	[1] Up to the present time the dredge has only been in use a part of the year and is only equipped for a double crew working 16 hours per day, hence the time lost from work.		[1] Original contract cost. [2] First cost, including necessary changes. [3] Mobile Harbor, 2,171,893.8 cubic yards; Pascagoula River (Henry Piaggio), 256,268.7 cubic yards. [4] Mobile Harbor, 2,340,847.8 cubic yards; Pascagoula River (Henry Piaggio), 256,268.7 cubic yards. [5] 715 hours of this time was due to dredge being out of commission, due to lack of funds. [6] Of the total coal shown, 2,272.78 tons, valued at $13,026.74, were furnished by private corporations while dredge was on work. [7] Of the 141 sleeves purchased, 29 were worn out by storm after a total of 6,528.1 hours; 5 were worn out, due to being defective, after a total of 882.2 hours; 3 were worn out, due to sinking pontoon, after total of 780.3 hours; 1 was worn out, due to tug fouling line after total of 39.8 hours; 38 used and still in service after total of 43,771.8 hours; 37 were worn out after total of 48,297.7 hours; 21 were transferred to dredge Gulfport; 7 are new and on hand. [8] Of this amount $3,385.27 was charged by steamer Chickasaw and launch Dauphin for towing in connection with the dredging work.	[1] Does not include outfit, pipe line, nor attendant plant. [2] Includes 80 pontoons, 2,400 feet pontoon pipe, and 800 feet of shore pipe, etc. [3] 1,648,361 cubic feet hogged wood, 28 pounds per cubic foot, at 30.14 cents per 100 cubic feet. [4] Flat rate of $5 per month for 1½ months; balance free. [5] Number used. [6] Indefinite. [7] Supplied from dredge. Labor cost of crew operating main dredging pump, approximately $17,300; pipe line, barges, anchors, etc., approximately $12,000.

Name	*Warroad.*	*Waterway.*	*Zeta.*
1. District	St. Paul, Minn	Vicksburg, Miss	St. Louis, Mo., Mississippi River Commission.
2. When built	1904	1912	1898.
3. Where built	Warroad, Minn	Dubuque, Iowa	Grafton, Ill.
4. Builder	Corps of Engineers, U. S. Army	Dubuque Boat & Boiler Works	Springfield Boiler & Manufacturing Co.
5. Time to build	11 months	16½ months	15 months.
6. Material of hull	White oak and fir	Steel	Steel.
7. Contract cost of dredge	$26,500	$97,592	$109,000.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	(*a*) $1,947.83; (*b*) $3,500.37	(*a*) $2,712.46; (*b*) included in 7	(*a*) $3,000.
9. Length	158 feet	163 feet	162 feet.
10. Beam	27 feet	34 feet	40 feet.
11. Depth	8 feet 6 inches	7 feet	7 feet 6 inches.
12. Draft:			
(*a*) Forward	3 feet	38 inches	3 feet 5 inches, 5 feet from bow.
(*b*) Aft	4 feet	41 inches	4 feet 8 inches, 2 feet from stern.
13. Displacement (long tons)	260	417	650.
14. Number of crew	11	30	43.
15. Number, size, and type of propelling engines	Two 10 by 60 inches, horizontal	Two 13-inch cylinders, 72-inch stroke	
16. Number, size, and type of pumping engines	Two 9 by 9 inches, direct connected, 75 indicated horsepower.	1 nonreversing triple expansion, 10, 16, 26 by 12 inches.	Two 16 and 26 by 18 inch horizontal tandem compound.
17. Cutter engines:			
(*a*) Diameter of cylinders	7 inches	7 inches	
(*b*) Stroke	8 inches	10 inches	
18. Hauling engines:			
(*a*) Diameter of cylinders	9 inches	8½ inches	6¾ inches.
(*b*) Stroke	12 inches	8 inches	8 inches.
19. Boilers:			
(*a*) Number and type	2, Scotch marine	2, Mississippi River	6, Mississippi River, cylindrical, flue.
(*b*) Length	109 inches	28 feet	28 feet 5½ inches.
(*c*) Diameter	72 inches	42 inches; 5 flues, 10 inches	48 inches.
(*d*) Heating surface (total)	600 square feet	1,160 square feet	3,996 square feet.
(*e*) Grate surface (total)	23 square feet	39.3 square feet	154 square feet.
20. Discharge pipe in use (average number of feet)	150 feet	168 feet	
21. Diameter of discharge pipe	12 inches	16 inches	32 inches.
22. Pontoons:			
(*a*) Number and material of those in use (average)	5, fir	4, steel	
(*b*) Dimensions	Length, 24 feet; beam, 10 feet; depth, 2 feet.	Length, 47 feet 6 inches; 12 feet wide; 3 feet deep.	
23. Revolutions per minute of propelling engines	16	14	
24. Revolutions per minute of pumping engines	265	218	
25. Type of agitator or cutter head	3 steel blades, parallel with shaft	8-blade spiral	Water-jet agitator.
26. Diameter of cutter	21¾ inches	4 feet 9½ inches	
27. Diameter of cutter shaft	3 inches	5½ inches	
28. Type of suction head	12-inch cast-iron pipe	Suction with cutter head	Upstream with water jet.
29. Revolutions per minute of cutter head	50	10	
30. Average boiler pressure (gauge)	130 pounds	140 pounds	
31. Kind of coal used	Tamarack wood	Bituminous	
32. Average gauge pressure in discharge pipe	15 pounds	15 pounds	
33. Average vacuum in suction pipe	16 inches	14 inches	

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Warroad.*	*Waterway.*	*Zeta.*
ATTENDANT PLANT.			
Towboat.			
34. Name of tug attached to dredge			Mercury.
35. Number of crew			6.
36. Displacement			83.
37. Draft:			
(*a*) Forward			3 feet 1 inch.
(*b*) Aft			2 feet 8 inches.
Launches.			
38. Name	Bull Calf		
39. Length	23 feet		
40. Beam	6 feet 3 inches		
41. Depth	3 feet 4 inches (molded depth)		
42. Draft	Forward, 1 foot 2 inches; aft, 2 feet 4 inches.		
43. Displacement	1 ton		
Barges.			
44. Identifying numbers of barges in use	6		
45. Usage	Pipe floats		
46. Displacement, light (each)	4 tons		
47. Capacity of barges (each)	15 tons		
WORK PERFORMED.			
48. Location of dredging		See remarks	Memphis Harbor.
49. Average depth before dredging		9 feet	6 to 9 feet.
50. Average depth after dredging		12.9 feet	9 to 12 feet.
51. Character of material dredged		Sand	Mud.
52. Rate of advance per hour (in feet straight ahead)		33.5	88.4.
53. Amount dredged during the year		58,767 cubic yards	78,524 cubic yards.
54. Total amount dredged by this dredge at this locality		See remarks	Do.
55. Average amount dredged:			
(*a*) Per hour (pumping)		226 cubic yards	406.6 cubic yards.
(*b*) Per day		1,160 cubic yards	5,608 cubic yards.
56. Maximum amount dredged in one month		30,000 cubic yards	62,718 cubic yards.
57. Total number of days upon which any dredging was done.		66	14.
58. Average number of working hours per working day.		8	12.83.
59. Maximum number of working hours per working day		8	24.

DISTRIBUTION OF TIME.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:									
(a) Pumping				365	10	4.17	193	50	2.21
(b) Handling pipe line				87	40	1.00			
(c) Handling swinging wires (cleaning suction)				3	40	.04	28	55	.33
(d) Going to and from wharf or anchorage									
(e) Placing dredge							28	45	.33
(f) Waiting for vessels to pass				4	30	.05		20	
61. Time lost from work:									
(a) Changing location of plant				305	30	3.49	36	20	.41
(b) Bad weather									
(c) Washing boilers and ordinary repairs				43		.49	16	15	.19
(d) Extraordinary repairs				32		.37			
(e) Other causes				7,782	30	88.84	8,323	15	95.02
(f) Sundays and holidays				136		1.55	132		1.51
62. Total hours in year	8,760		100.00	8,760		100.00	8,760		100.00
63. Total time at work				461		5.26	251	50	2.87
64. Total time lost from work				8,299		94.74	8,508	10	97.13
COST OF WORK.									
Dredge.									
65. Pay rolls					$5,166.05			$1,917.21	
66. Fuel for boilers					1,547.84			2,291.50	
67. Coal for galley					31.36				
68. Water									
69. Supplies, subsistence					1,194.12			723.56	
70. Supplies, engine room					117.09				
71. Other supplies					280.31				
72. Renewals or additions to outfit					1,376.12				
73. Ordinary repairs:									
(a) Hull					154.77			2,414.90	
(b) Machinery (exclusive of main dredging pump)		$2.15			137.96			2,282.92	
74. Laundry, ice, miscellaneous expenses					53.65				
75. Total			$2.15			$10,059.27			$9,630.09
Main dredging pump.									
76. Diameter of runner	40 inches			50 inches			69 inches.		
77. Volute (lined or unlined)	Unlined			Lined. Removable steel liners			Unlined.		

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Warroad.*				*Waterway.*				*Zeta.*			
COST OF WORK—continued. *Main dredging pump*—Continued.	Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.		Number purchased.	Number pumping hours used.	Total cost.	
78. Renewals:												
(a) Volute												
(b) Runner												
(c) Volute liners												
(d) Runner liners												
(e) Head and back liners												
79. Miscellaneous repairs												
80. Total												
Pipe line.												
81. Renewals:												
(a) Rubber sleeves												
(b) Pipe												
(c) Pontoons												
(d) Outfit												
82. Repairs												
83. Miscellaneous							$180.00				$665.55	
84. Total								$180.00				$665.55
Towboats and launches.												
85. Pay rolls												
86. Fuel for boilers												
87. Coal for galley												
88. Water												
89. Supplies, subsistence												
90. Supplies, engine room												
91. Launch supplies												
92. Other supplies												
93. Renewals of or additions to outfit												
94. Ordinary repairs												
95. Laundry, ice, miscellaneous expenses, etc												
96. Total												

Barges (amounts chargeable to dredge).						
97. Ordinary repairs to barges	....		....		....	
98. Miscellaneous expenses	....		....		....	
99. Total field cost	....	$2.15		$10,239.27		....
100. Total field cost per cubic yard (cents)	....	....	17.42			....
Extra expenses.						
101. Office expenses, superintendence, surveys, etc	142.65		471.16		314.62	
102. Extraordinary repairs to dredge:						
(a) Hull	....		....		....	
(b) Machinery (exclusive of main dredging pump)	....		....		....	
103. Extraordinary repairs to towboats and launches	....		....		....	
104. Extraordinary repairs to barges	....	142.65	....	....	....	....
105. Total		$144.80		$10,710.43		$10,610.26
106. Gross cost per cubic yard (cents)	....		18.23		13.5.	
MISCELLANEOUS.						
107. Fuel consumed by dredge, tons or barrels	....		345.5			
108. Fuel consumed by auxiliary plants, tons or barrels	....		....			
109. Total cost of all fuel	....		$1,547.84			
110. Total water purchased (gallons)	....		....			
111. Cost of water per 1,000 gallons	....		....			
112. Linear feet of pipe line built during year and cost per linear foot	....		80 feet, at $2.25 per foot			
113. Average increase of depth of channel cut over	....		4 feet			
114. Maximum dredging depth	12 feet		....			
115. Number of shifts worked per day	2		....			
	Remarks.		*Remarks.*			
	No dredging was done during the year, channel depths having been sufficient and the project having been completed to an adequate extent for existing navigation. The dredge has been cared for and occupied by a survey party on Lake of the Woods under direction of the United States Lake Survey office at Detroit, Mich. Funds are available and authority has been granted to make extraordinary repairs to the hull in the spring of 1918.		Localities dredged and cubic yards removed at each place: Big Sunflower River near Pentecost, Miss., 51,967. Mouth of Yazoo River near Vicksburg, Miss., 6,800. This dredge was rented to the Bogue Phalia Drainage district, Miss., from Apr. 20 to Nov. 1, 1917. The period thus employed is included in time lost from work, 61-e, above. Coal was purchased by the short ton.			

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*No. 6.*	*No. 1407.*[1]
1. District	Mobile, Ala	First and second Mississippi River commission districts.
2. When built	1903	1915.
3. Where built	Tuscaloosa, Ala	Memphis, Tenn.
4. Builder	United States	United States, Government fleet labor.
5. Time to build		2 months.
6. Material of hull	Steel and wood	Creosoted wood.
7. Contract cost of dredge	$3,600 for hull	$13,445.
8. (*a*) Cost of outfit; (*b*) cost of pipe line	$3,600, cabin and machinery	(*a*) $1,000.
9. Length	122 feet 6¼ inches	120 feet.
10. Beam	24 feet	30 feet.
11. Depth	5 feet	7 feet.
12. Draft:		
(*a*) Forward	2 feet 1 inch	2 feet.
(*b*) Aft	1 foot 2 inches	Do.
13. Displacement (long tons)	91	165.
14. Number of crew		6.
15. Number, size, and type of propelling engines		
16. Number, size, and type of pumping engines	One 8 by 8 inch upright, direct connected, Morris.	
17. Cutter engines:		
(*a*) Diameter of cylinders	5 inches	
(*b*) Stroke	do	
18. Hauling engines:		
(*a*) Diameter of cylinders	5 inches, single drum	
(*b*) Stroke	6 inches	
19. Boilers:		
(*a*) Number and type	1 horizontal, tubular, Nagle	1 Mississippi River type, return flue.
(*b*) Length	19 feet 3 inches	26 feet.
(*c*) Diameter	4 feet 8 inches	38 inches.
(*d*) Heating surface (total)	815 square feet	437.86 square feet.
(*e*) Grate surface (total)	20.83 square feet	18.75 square feet.
20. Discharge pipe in use (average number of feet)		
21. Diameter of discharge pipe	8 inches	10 inches.
22. Pontoons:		
(*a*) Number and material of those in use (average)		
(*b*) Dimensions		
23. Revolutions per minute of propelling engines		
24. Revolutions per minute of pumping engines	209	
25. Type of agitator or cutter head	Straight blade, rotary	
26. Diameter of cutter	30 inches	
27. Diameter of cutter shaft M	3½ inches	
28. Type of suction head	Plain nipple	

29. Revolutions per minute of cutter head	20	
30. Average boiler pressure (gauge)	90 pounds	
31. Kind of coal used	Bituminous	
32. Average gauge pressure in discharge pipe		
33. Average vacuum in suction pipe		
ATTENDANT PLANT.		
Towboat.		
34. Name of tug attached to dredge		
35. Number of crew		
36. Displacement		
37. Draft:		
(a) Forward		
(b) Aft		
Launches.		
38. Name		
39. Length		
40. Beam		
41. Depth		
42. Draft		
43. Displacement		
Barges.		
44. Identifying numbers of barges in use		
45. Usage		
46. Displacement, light (each)		
47. Capacity of barges (each)		
WORK PERFORMED.		
48. Location of dredging		
49. Average depth before dredging		
50. Average depth after dredging		
51. Character of material dredged		
52. Rate of advance per hour (in feet straight ahead)		
53. Amount dredged during the year		5,345.
54. Total amount dredged by this dredge at this locality		
55. Average amount dredged:		
(a) Per hour (pumping)		54.5.
(b) Per day		124.3
56. Maximum amount dredged in 1 month		
57. Total number of days upon which any dredging was done		
58. Average number of working hours per working day		
59. Maximum number of working hours per working day		

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*No. 6.*			*No. 1407.*		
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
DISTRIBUTION OF TIME.						
60. Time at work:						
(*a*) Pumping				99		
(*b*) Handling pipe line						
(*c*) Handling swinging wires (cleaning suction)						
(*d*) Going to and from wharf or anchorage						
(*e*) Placing dredge						
(*f*) Waiting for vessels to pass						
61. Time lost from work:						
(*a*) Changing location of plant						
(*b*) Bad weather						
(*c*) Washing boilers and ordinary repairs						
(*d*) Extraordinary repairs						
(*e*) Other causes						
(*f*) Sundays and holidays						
62. Total hours in year	8,760		100.00	8,760		100.00
63. Total time at work				99		
64. Total time lost from work						
COST OF WORK.						
Dredge.						
65. Pay rolls					$714.10	
66. Fuel for boilers					480.00	
67. Coal for galley						
68. Water						
69. Supplies, subsistence					191.66	
70. Supplies, engine room					28.08	
71. Other supplies						
72. Renewals or additions to outfit						
73. Ordinary repairs:						
(*a*) Hull		$10.13				
(*b*) Machinery (exclusive of main dredging pump)		204.90			29.95	
74. Laundry, ice, miscellaneous expenses					21.00	
75. Total			$215.03			$1,464.70

Main dredging pump.						
76. Diameter of runner	28 inches			Centrifugal, 10-inch sand pump, 50-inch runner.		
77. Volute (lined or unlined)	Unlined					
	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.
78. Renewals:						
(*a*) Volute						
(*b*) Runner						
(*c*) Liners						
(*d*) Runner liners						
(*e*) Head and back liners						
79. Miscellaneous repairs						
80. Total						
Pipe line.						
81. Renewals:						
(*a*) Rubber sleeves						
(*b*) Pipe						
(*c*) Pontoons						
(*d*) Outfit						
82. Repairs						
83. Miscellaneous						
84. Total						
Towboats and launches.						
85. Pay rolls						
86. Fuel for boilers						
87. Coal for galley						
88. Water						
89. Supplies, subsistence						
90. Supplies, engine room						
91. Launch supplies						
92. Other supplies						
93. Renewals of or additions to outfit						
94. Ordinary repairs						
95. Laundry, ice, miscellaneous expenses, etc						
96. Total						

TABLE 5.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*No. 6.*	*No. 1407.*
Barges (amounts chargeable to dredge).		
97. Ordinary repairs to barges	....	....
98. Miscellaneous expenses	....	....
99. Total field cost	$215.03	....
100. Total field cost per cubic yard (cents)		
Extra expenses.		
101. Office expenses, superintendence, surveys, etc	....	....
102. Extraordinary repairs to dredge:		
(*a*) Hull	....	....
(*b*) Machinery (exclusive of main dredging pump)	....	....
103. Extraordinary repairs to towboats and launches	....	....
104. Extraordinary repairs to barges	....	....
105. Total	$215.03	....
106. Gross cost per cubic yard (cents)		27.4
MISCELLANEOUS.		
107. Fuel consumed by dredge, tons or barrels		120 short tons at $4.
108. Fuel consumed by auxiliary plant, tons or barrels		
109. Total cost of all fuel		
110. Total water purchased (gallons)		
111. Cost of water per 1,000 gallons		
112. Linear feer of pipe line built during year and cost per linear foot		
113. Average increase of depth of channel cut over		
114. Maximum dredging depth	?	18 feet.
115. Number of shifts worked per day		3.
	Remarks.	*Remarks.*
	This boat out of commission as a dredge the entire year on account of boilers being condemned. Used as quarter boat a part of year by party painting and repairing lock houses. Boiler taken down and being overhauled by putting in new plates for parts condemned, at United States shops, Tuscaloosa, Ala.	Operated 2 months at Barfield, Ark., and 2 months at Old Town, Ark. Laid up at Barfield, Ark., 5 months and 3 months at Gayoso Bend., Mo., and Old Town, Ark.

[1] Sand and gravel digger, formerly barge No. 1407.

TABLE 6.

DIPPER DREDGES.

4297

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917.*

Name, letter, or number	*Adams, Col. M. B.*	*Addison.*	*Ajax.*	*Appleton.*
1. District	Wheeling, W. Va	Wheeling, W. Va	Rock Island, Ill	Milwaukee, Wis.
2. Length	112 feet	75 feet	73 feet	90 feet.
3. Beam	34 feet	30 feet	26 feet	32 feet.
4. Depth	7 feet 3 inches	7 feet 2 inches	6 feet	7 feet.
5. Draft:				
(a) Forward	5 feet 6 inches	38 inches	3 feet 5 inches	3 feet 6 inches.
(b) Aft	3 feet 4 inches	30 inches	1 foot 7 inches	2 feet 8 inches.
6. Displacement	525 tons	177 tons	124 tons	214 long tons.
7. Builder:				
(a) Hull and material of hull	Marion Steam Shovel Co.; steel	United States; wood	H. S. Brown; wood	Wood.[1]
(b) Machinery	do	Osgood Dredge Co	Osgood Dredge Co	Unknown.
8. Where built	Huntington, W. Va	Kanawha River, W. Va	Quincy, Ill	Dubuque, Iowa.
9. When built	1912	1880; rebuilt 1910	1876	1872.
10. Time to build	8 months	To rebuild, about 5 months	Not known	Unknown.
11. Contract cost	$43,500			$13,000.
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	$44,577.86	$14,000 (about)	$11,300 (purchase cost)	$13,000.
13. Bucket:				
(a) Type	Dipper (2)	Dipper	Dipper	Scoop dipper.
(b) Capacity	2 cubic yards and 4 cubic yards	1½ cubic yards	1½ cubic yards	One 2½; one 1.13; one 1.31 cubic yards.
14. Length of boom	40 feet	31 feet	30 feet	39 feet (dipper handle).
15. Maximum dredging depth	21 and 26 feet (interchangeable dipper handles).	16 feet	17 feet	17 feet.
16. Dimensions of main hoisting-engine cylinders.	13 by 16 inches	9 by 18 inches	8 feet by 16 inches	12 inches diameter; 14-inch stroke.
17. Dimensions of swinging engine	9 by 9 inches	Cylinders 6½-inch bore and 8-inch stroke.	None; swing from main engine	8 inches diameter; 12-inch stroke.
18. Boilers:				
(a) Number	1	1	1	1.
(b) Type	Locomotive	Locomotive fire box	Upright tubular	Scotch marine; Adamson furnace 42 inches diameter.
(c) Dimensions	72 inches by 18 feet	54 inches by 15 feet 6 inches	4 feet 8 inches by 10 feet	12 feet 8 inches long; 90 inches diameter.
(d) Number, diameter, and length of tubes in one boiler.	180; 2½ inches; 11 feet ½ inch	94; 2½ inches; 118¼ inches	144; 2 inches; 76 inches	90; 3 inches; 8 feet 8¾ inches.
(e) Heating surface (total)	1,349 square feet	555 square feet	456 square feet	900 square feet.
(f) Grate surface (total)	27½ square feet	16 square feet	12 square feet	25 square feet.
19. Working steam pressure	125 pounds	90 pounds	120 pounds	110 pounds.

ATTENDANT PLANT.				
Towboats.				
20. Name of tug attached to dredge	Gen. Craighill	James Rumsey	None	Fox and Wolf.
21. Owner	United States	United States		United States.
22. Number of crew	7	8		Fox, 7; Wolf, 5.
Launches.				
23. Name	None	None		
24. Number of crew	do			
Scows.				
25. Number of scows in use	2	2		3.
26. Type	Side dump, wood	Side dump		2 side dump; 1 open.
27. Capacity (each)	95 cubic yards	60 cubic yards		Dump scows, 65 cubic yards each; open scow, 1 ton.
28. Identifying letter or number	U. S. E. D. Wheeling Nos. 27 and 28.	Nos. 33 and 34		Dump scows 1 and 2; open scow No. 8.
WORK PERFORMED.				
29. Location of dredging	Dam No. 22, Ohio River	Kanawha River, W. Va.		Fox River improvement.
30. Average depth before dredging	1	5 feet		
31. Average depth after dredging	1	8 feet		
32. Average width of cut	1	16 feet		
33. Total distance cut ahead by dredge, in feet.	1	7,585		10 feet (without moving dredge).
34. Total amount dredged in cubic yards during year:				
(a) Rock; (1) unit cost	(a) None	(a) 13,111 (1)		
(b) Sand and mud; (2) unit cost	(b) 186,913; (2) 10.04 cents	(b) 15,880 (1)		
35. Average number of cubic yards dredged:				
(a) Per day	1,070	237		
(b) Per hour	134	29		
36. Maximum number of cubic yards dredged:				
(a) In one day	3,500	800		
(b) In one hour	437.5	100		
37. Average number of hours worked per day.	8	8		
38. Total number of days upon which any dredging was done.	127	122		
39. Average distance in miles from work to dump.	¼ to ½	¾		
40. Number of scows loaded during year	1,182	216		
41. Number of scows loaded per day	19 maximum; 6 to 12 average	Average 3		
42. Average time to load one scow	10 to 12 miutes	1 hour 30 minutes		
43. Average load in cubic yards per scow	90	60		

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Adams, Col. M. B.*		*Addison.*		*Ajax.*		*Appleton.*	
WORK PERFORMED—continued.								
44. Average time to tow load to dump and return.	20 to 25 minutes		45 minutes					
45. Number of scows per tow	1		1					
46. Character of dredged material and average percentage:								
(a) Mud	Practically none							
(b) Rock	None		45					
(c) Sand	100 per cent; includes gravel		55					
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
Distribution of effective working time in hours.								
47. Dredging	633		920					
48. Handling scows	72		40					
49. Spudding up	10		20					
50. Miscellaneous	301							
Distribution of time lost in hours.								
51. Repairing:								
(a) Hull	389							
(b) Machinery	953		56					
52. Bad weather	797		112					
53. Changing location of plant	240		32					
54. Delays	16		65					
55. Sundays and holidays	744		268					
56. Out of commission	144		7,247				8,760	
57. Miscellaneous	4,461							
58. Total number of hours in year	8,760		8,760		8,760		8,760	
COST OF WORK.								
Dredge.								
59. Pay rolls	$8,521.35		$3,558.44					
60. Coal	3,040.68		502.16					
61. Supplies:								
(a) Subsistence								
(b) Machinery	1,004.03		538.72					
(c) Miscellaneous	378.52		106.92					

62. Renewals or additions to outfit	1,284.85			159.49			....			....		
63. Ordinary repairs:												
(a) Hull	542.84			20.00			....			[illegible]		
(b) Machinery	3,434.81			973.87			....			....		
64. Laundry, ice, miscellaneous	181.28			49.49			....			....		
65. Total		$18,478.36			$5,909.09			....			....	
Towboats.												
66. Operating cost for year	(4)			7,652.95			....			....		
67. Ordinary repairs	(4)			245.12			....			....		
68. Total		....			7,898.07			....			....	
Launch.												
69. Operating cost for year	....			....			....			....		
70. Ordinary repairs	....			....			....			....		
71. Total		....			....			....			....	
Barges and scows.												
72. Ordinary repairs	130.26			....			....			....		
73. Total		130.26			....			....			....	
74. Total field cost			$18,608.62			$13,807.16			....			....
Gross cost.												
75. Officeexpenses, superintendence, surveys, etc.			None.			150.00			....			$85.00
76. Extraordinary repairs to dredge:												
(a) Hull			....			....			....			210.20
(b) Machinery			....			....			....			1,571.95
77. Extraordinary repairs to towboats and launches.			(4)			....			....			....
78. Extraordinary repairs to barges and scows.			None.			....			....			....
79. Grand total			18,608.62			13,957.16			....			1,867.15
Cost per cubic yard.												
80. Field cost per cubic yard:												
(a) Mud or sand	10.04 cents			47.6 cents[3]			....					
(b) Rock	....						....					
81. Gross cost per cubic yard:												
(a) Mud or sand	10.04 cents			48.14 cents			....					
(b) Rock	....						....					

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Adams, Col. M. B.*	*Addison.*	*Ajax.*	*Appleton.*
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons	839	203		
83. Fuel consumed by auxiliary plant in long tons.	(4)	546		
84. Cost per hour of effective working time.	$18.32			
85. Cost of fuel per ton	$3.50	$2.43 (average)		
86. Number of days in commission	328	175		None.
87. Number of shifts worked per day	1	1	1	1.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	No steamboat is regularly employed with the operation of the dredge. The Craighill is also used in miscellaneous work which requires the use of a steamboat in building lock and dam No. 22, Ohio River. The dredge was also engaged in removing cribs and dredging fill to place behind land wall. [1] Not applicable. The dredge is used on various kinds of work, such as removing cofferdams, banking and filling cofferdams, cutting channels and harbors for floating plant during extreme low water, etc. [2] Including wire hoisting line. [3] Including manila rope, spud lines, and rolling log. [4] See Gen. Craighill.	[1] This includes the amount cost and the 216 scows which were loaded. [2] The time consumed to excavate the different materials was not kept, hence it will be impossible to say exactly the cost per yard for removing each of the different materials.	Ajax was idle all season in Milan boat yard.	[1] Rebuilt by United States in 1906 and 1907. Not in commission, as extraordinary repairs were not completed owing to lack of funds.

Name, letter, or number	*Attalla.*	*Carrollton.*	*Champoeg.*	*Cheraw.*
1. District	Montgomery, Ala.	Second, Cincinnati, Ohio	Second, Portland, Oreg.	Charleston, S. C.
2. Length	75 feet	86 feet	80 feet	155 feet.
3. Beam	26 feet 4 inches	30 feet	30 feet	28 feet 6 inches.
4. Depth	5 feet 6 inches	6 feet 9 inches	5 feet	8 feet bow; 7 feet 1 inch amidship; 7 feet 3 inches stern.
5. Draft:				
(a) Forward	1 foot 3 inches	4 feet 4 inches	2 feet 10 inches	5½ feet.
(b) Aft	3 feet 5 inches	do.	2 feet 7 inches	6 feet.
6. Displacement	206 long tons	250 tons	165 tons	620 feet.
7. Builder:				
(a) Hull and material of hull	U. S. Engineer Department; wood.	American Bridge Co.; steel	Joseph Supple; wood	Harlan & Hollingsworth Corporation.
(b) Machinery	Osgood Dredge Co.	The Bucyrus Co.	Featherstone Foundry & Machine Co.	Osgood Dredge Co.
8. Where built	Lock 4, Coosa River, Ala.	Hull at Ambridge, Pa.	Portland, Oreg.	Wilmington, Del.
9. When built	1902	1915	1904	1906.
10. Time to build	3 months	Unknown	3½ months	1 year 6 months.
11. Contract cost		$22,272	$19,200	$18,000 (hull, A-frame, boom, and turntable).
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	$10,000	Unknown; equipment transferred from old dredge.	$20,200	$45,500.
13. Bucket:				
(a) Type	Dipper; Bucyrus Co.	Dipper	Dipper	Dipper.
(b) Capacity	1½ cubic yards	2½ cubic yards	1 cubic yard	1¾ cubic yards.
14. Length of boom	34 feet	40 feet	40 feet	49 feet.
15. Maximum dredging depth	15 feet	20 feet	23 feet	18 feet.
16. Dimensions of main hoisting-engine cylinders.	8½-inch diameter; 12-inch stroke	10-inch diameter; 14-inch stroke	8 by 12 inches	16½ by 18 inches.
17. Dimensions of swinging engine	8-inch diameter; 12-inch stroke	18-inch diameter; 8-foot stroke	5 by 9 inches (2 cylinders)	
18. Boilers:				
(a) Number	1	1	1	2.
(b) Type	Marine	Scotch marine	Locomotive	Return tubular.
(c) Dimensions	14 by 6 feet	Length, 15 feet 6 inches; diameter, 84 inches.	42 inches by 15 feet 4 inches	Diameter, 72 inches; length, 18 feet.
(d) Number, diameter, and length of tubes in one boiler.	48 tubes, 3-inch diameter, 9 feet long.	60; diameter, 3½ inches; length, 12 feet 2½ inches.	54 of 2½ inches by 8 feet 9 inches.	
(e) Heating surface (total)	470 square feet	875 square feet	366 square feet	1,259 square feet.
(f) Grate surface (total)	17½ square feet	20 square feet	12 square feet	40 square feet.
19. Working steam pressure	130 pounds	135 pounds	90 pounds	90 pounds.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Attalla.*	*Carrollton.*	*Champoeg.*	*Cheraw.*
ATTENDANT PLANT.				
Towboats.				
20. Name of tug attached to dredge		Chartered towboat Helen M. and Mary Jane; United States steamers Kentucky and Gregory.		Ida.
21. Owner		Chartered boats: Charles Armstrong.		Jenkins & McKevlin.
22. Number of crew		Kentucky, 11; Gregory, 11; Helen M. and Mary Jane, 2.		5.
Launches.				
23. Name				
24. Number of crew				
Scows.				
25. Number of scows in use		2		2.
26. Type		Side dump, steel		Bottom dump
27. Capacity (each)		125 cubic yards		245 cubic yards.
28. Identifying letter or number		Nos. 53 and 54		Nos. 1 and 2.
WORK PERFORMED.				
29. Location of dredging	Dam No. 5, Coosa River, Ala	Kentucky River, Ky	Not operated [1]	Estherville-Minim Creek Canal.
30. Average depth before dredging	2 feet	3 feet		4 feet.
31. Average depth after dredging	3.5 feet	12 feet		8 feet.
32. Average width of cut	50 feet	30 feet		60 feet.
33. Total distance cut ahead by dredge, in feet.	2,400 feet	9,115 feet		600 feet.
34. Total amount dredged in cubic yards during year:				
(*a*) Rock; (1) unit cost	(*a*) 7,120; (1) $0.437	(*a*) 9,500; (1) $0.5385		
(*b*) Sand and mud; (2) unit cost	(*b*) 4,770; (2) $0.0365	(*b*) 84,987; (2) $0.1075		(*b*) 18,447; (2) 21.20 cubic yard.
35. Average number of cubic yards dredged:				
(*a*) Per day	50	647		709.5.
(*b*) Per hour	7.4	64.7		108.
36. Maximum number of cubic yards dredged:				
(*a*) In one day	70	1,250		995.
(*b*) In one hour	9	145		132.5.

37. Average number of hours worked per day.	9		10				8 hours.	
38. Total number of days upon which any dredging was done.	137		146				26.	
39. Average distance in miles from work to dump.			¾				½.	
40. Number of scows loaded during year.			722				202.	
41. Number of scows loaded per day			4.9				7.77.	
42. Average time to load one scow			90 minutes				50 minutes.	
43. Average load in cubic yards per scow			116				91.3.	
44. Average time to tow load to dump and return.			70 minutes				30 minutes.	
45. Number of scows per tow			1				1.	
46. Character of dredged material and average percentage:								
(a) Mud	33⅓ per cent		8 per cent				100.	
(b) Rock	66⅔ per cent		10 per cent					
(c) Sand			82 per cent					
Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
47. Dredging	1,093		512				170	45
48. Handling scows			229					
49. Spudding up			214					
50. Miscellaneous	593		132					
Distribution of time lost in hours.								
51. Repairing:								
(a) Hull	37		319					
(b) Machinery	309		378				5	
52. Bad weather	71		137					
53. Changing location of plant	95		362					
54. Delays			173					
55. Sundays and holidays	882		590				120	
56. Out of commission	3,504						8,016	
57. Miscellaneous	2,176		5,714				448	15
58. Total number of hours in year	8,760		8,760		8,760		8,760	

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Attalla.*		*Carrollton.*		*Champoeg.*		*Cheraw.*	
COST OF WORK.								
Dredge.								
59. Pay rolls	$2,111.87		$5,490.55		....		$768.00	
60. Coal	880.07		1,807.50		....		280.00	
61. Supplies:								
(a) Subsistence	571.58		....		....		225.18	
(b) Machinery	70.75		100.26		....		....	
(c) Miscellaneous	212.45		126.53		....		13.78	
62. Renewals or additions to outfit	....		161.23		....		51.30	
63. Ordinary repairs:								
(a) Hull	74.62		619.11		....		....	
(b) Machinery	399.98		209.45		....		....	
64. Laundry, ice, miscellaneous	....		....		....		15.77	
65. Total		$4,321.32		$8,514.63		....		$1,354.03
Towboats.								
66. Operating cost for year	....		5,339.91		....		1,122.31	
67. Ordinary repairs	....		104.71		....		....	
68. Total		....		5,444.62		....		1,122.31
Launch.								
69. Operating cost for year	....		....		....		....	
70. Ordinary repairs	....		....		....		....	
71. Total		....		....		....		....
Barges and scows.								
72. Ordinary repairs	....		313.71		....		....	
73. Total		....		313.71		....		....
74. Total field cost		$4,321.32		$14,272.96		....		$2,476.34

Gross cost.				
75. Office expenses, superintendence, surveys, etc.	465.25	330.00	....	1,435.02
76. Extraordinary repairs to dredge:				
(a) Hull	....	....	....	....
(b) Machinery	....	....	....	....
77. Extraordinary repairs to towboats and launches	....	428.83	....	....
78. Extraordinary repairs to barges and scows	....	....	....	....
79. Grand total	4,781.57	15,031.79	....	3,911.36
Cost per cubic yard.				
80. Field cost per cubic yard:				
(a) Mud or sand	$0.033	$0.1078	....	31.41 cents.
(b) Rock	$0.395	$0.5385	....	
81. Gross cost per cubic yard:				
(a) Mud or sand	$0.0365	$0.1134	....	21.20 cents.
(b) Rock	$0.437	$0.5670	....	
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons	250.7	657	....	81.
83. Fuel consumed by auxiliary plant in long tons.	....	Coal 222 tons, gasoline 1,510 gallons, kerosene 1,742 gallons.	....	23.
84. Cost per hour of effective working time	$2.84	$13.82	....	$22.90.
85. Cost of fuel per ton	$3.52 long ton	Coal, $2.75; gasoline, 24½ cents per gallon; kerosene, 12 cents per gallon.	....	$4.31.
86. Number of days in commission	220	365	....	31.
87. Number of shifts worked per day	1	1	1	1.
	Remarks.	***Remarks.***	***Remarks.***	***Remarks.***
	Total cost of dredging rock, $3,115.09; unit cost, $0.395; gross cost, $0.437. This stone was used in the construction of Dam No. 5. Total cost of dredging mud, $174.35; unit cost, $0.033; gross cost, $0.0365. Mud was taken from entrance to Lock No. 4. Furnished steam for cableway at a total cost of $524.84. Cost of assisting in placing cribs in main dam was $972.29.	From time to time when needed steamer Kentucky and towboat Gregory and chartered towboats Helen M and Mary Jane were temporarily attached to dredge. Kentucky, 50 days; Gregory, 3 days; Helen M, 63 days; and Mary Jane, 82 days.	[1] The dredge was not in serviceable condition during the year. A new hull is in course of construction.	Dredging to restore the depth to 6 feet with a minimum width of 50 feet; at northern end of Estherville-Minim Creek Canal. Drill boats: None employed.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Cincinnati.*	*Davenport.*	*Frankfort.*	*Gaillard, Col. D. D.*
1. District	First, Cincinnati, Ohio	Rock Island, Ill	Second, Cincinnati, Ohio	Duluth, Minn.
2. Length	112 feet on deck	110 feet	72 feet	116 feet.
3. Beam	34 feet	40 feet	28 feet	40 feet.
4. Depth	6 feet 10 inches on center line	6 feet	5 feet 5 inches	Dipper end, 11 feet 6 inches; after end, 9 feet 6 inches.
5. Draft:				
(a) Forward	3 feet	3 feet 6½ inches	3 feet	7 feet 3 inches.
(b) Aft	do	2 feet 10½ inches	2 feet	6 feet 1 inch.
6. Displacement	297 long tons (at 3 feet draft)	348 long tons	115 tons	Estimate, 780 tons.
7. Builder:				
(a) Hull and material of hull	M. A. Sweeney Shipyard & Foundry Co.; steel and iron.	Rock Island Bridge & Iron Works.	U. S. Engineer Department; wood.	Hartmann-Greiling Co.
(b) Machinery	M. A. Sweeney Shipyard & Foundry Co. (United States design).	Osgood Dredge Co., Marion, Ohio.	The Marion Steam Shovel Co	Bucyrus Co.
8. Where built	Jeffersonville, Ind	Rock Island, Ill	Dam No. 39, Ohio River	Green Bay, Wis.
9. When built	1913-1915	1914	1915	1916.
10. Time to build	25.8 months	1 year	Unknown	14 months.
11. Contract cost	$63,490			$108,184.
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	$70,656.36	$56,663	Machinery, $10,193.26; outfit transferred from old dredge.	$112,685.48.
13. Bucket:				
(a) Type	Messable, manganese steel	Dipper	Dipper	Dipper.
(b) Capacity	2½ cubic yards	2 cubic yards	1¼ cubic yards	4½ cubic yards.
14. Length of boom	Crane, 24.8 feet from center	45 feet	31 feet	60 feet.
15. Maximum dredging depth	15 foot open channel; 18 to 20 foot harbor.	18 feet	18 feet	30 feet.
16. Dimensions of main hoisting-engine cylinders.	12 inches diameter by 16-inch stroke.	Double cylinder, 12 by 16 inches.	8-inch diameter; 10-inch stroke	14 by 16 inches.
17. Dimensions of swinging engine	18 inches diameter by 7½-foot stroke.	Double cylinder, 8 by 8 inches		9 by 9 inches.
18. Boilers:				
(a) Number	1 main; 1 auxiliary	1	1	1.
(b) Type	Hawkes combined fire and water tube (main).	Locomotive fire box	Fire box; tubular	Scotch marine.
(c) Dimensions	60 inches diameter by 14 feet long (main).	6 feet 6 inches diameter; 20 feet 6 inches long.	15 feet by 50 inches	12 feet diameter; 11 feet 2 inches long.
(d) Number, diameter, and length of tubes in one boiler.	Seventy 3½-inch fire tubes, twenty 4-inch water tubes.	255; 2 inches	No. 102; 2 inches; length, 9 feet	190 tubes, 3 inches diameter by 7 feet 11 inches long.
(e) Heating surface (total)		1,620 square feet	530 square feet	1,454 square feet.
(f) Grate surface (total)	27 square feet	45.5 square feet	16.8 square feet	54 square feet.
19. Working steam pressure	150 pounds	125 pounds	125 pounds	130 pounds.

ATTENDANT PLANT.						
Towboats.						
20. Name of tug attached to dredge	Cayuga	Fury	See remarks	Essayons.		
21. Owner	United States	United States		United States.		
22. Number of crew	9	10		6.		
Launches.						
23. Name		Wacouta				
24. Number of crew		1				
Scows.						
25. Number of scows in use	2	4		2.		
26. Type	Steel, side dump	8 side pockets, flaring sides		Steel (dump).		
27. Capacity (each)	125 cubic yards	320 cubic yards		587 cubic yards each.		
28. Identifying letter or number	Nos. 11 and 12	17, 18, 19, 20		11 and 12.		
WORK PERFORMED.						
29. Location of dredging	Ohio River improvement	Below Lock No. 1		Grand Marais, Mich.	Onto-nagon, Mich.	Duluth-Superior.
				Feet.	*Feet.*	*Feet.*
30. Average depth before dredging	3 feet above low water	1.9 feet below low water		11.5–22	12–18	17–22
31. Average depth after dredging	4 feet below low water	7.5 feet below low water		18–22	15–19	22–24
32. Average width of cut	32 feet	38 feet		35	35	30,35
33. Total distance cut ahead by dredge, in feet.	17,540	10,500 feet		10,216	3,904	31,700
34. Total amount dredged in cubic yards during year:						
(*a*) Rock; (1) unit cost						
(*b*) Sand and mud; (2) unit cost	(*b*) 124,804; (2) $0.248	(*b*) 82,933 cubic yards; (2) $0.270		(*b*) 210,915; (2) 15.76 cents.		
35. Average number of cubic yards dredged:						
(*a*) Per day	1,560	674 cubic yards		1,562.33.		
(*b*) Per hour	195	115 cubic yards		243.9.		
36. Maximum number of cubic yards dredged:				Grand Marias, Mich.	Onto-nagon, Mich.	Duluth-Superior.
(*a*) In 1 day	2,092	1,107		2,224	2,610	2,835
(*b*) In 1 hour	300	160		283.66	326.25	354.375
37. Average number of hours worked per day.	8	5.8 hours		6.409	5.75	6.634
38. Total number of days upon which any dredging was done.	111	123		42	20	73

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Cincinnati.*		*Davenport.*		*Frankfort.*		*Gaillard, Col. D. D.*	
WORK PERFORMED—continued.								
39. Average distance in miles from work to dump.	¾ to 1½ miles.		3 miles.				About 1 mile.	
40. Number of scows loaded during year.	1,152.		1,065.				385.	
41. Number of scows loaded per day.	11.		8.7.				2.84.	
42. Average time to load 1 scow.	30 minutes.		35 minutes.				2.25 hours.	
43. Average load in cubic yards per scow.	108.		77 cubic yards.				547.83.	
44. Average time to tow load to dump and return.	33 minutes.		55 minutes.				40 minutes.	
45. Number of scows per tow.	1.		1.				1.	
46. Character of dredged material and average percentage:								
(*a*) Mud	5.						15 per cent.	
(*b*) Rock	60.		60.					
(*c*) Sand	35.		40.				85 per cent.	
Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
47. Dredging	638	20	647	10			864	30
48. Handling scows	2	5	67	45				
49. Spudding up								
50. Miscellaneous	45	55	4	30				
Distribution of time lost in hours.								
51. Repairing:								
(*a*) Hull	72							
(*b*) Machinery	324	50	53	40			109	10
52. Bad weather	1,068	50	6	45			230	15
53. Changing location of plant	241	10	19	20			143	20
54. Delays	50	50	32				20	45
55. Sundays and holidays	768		2,624				264	
56. Out of commission	2,976		5,136				1,288	
57. Miscellaneous	2,572		168	50				
58. Total number of hours in year	8,760		8,760		8,760		8,760	2,920

COST OF WORK.												
Dredge.												
59. Pay rolls	$7,514.31			$4,534.31						$10,034.82		
60. Coal	2,598.80			2,256.67						5,906.44		
61. Supplies:												
(a) Subsistence	2,000.81			1,125.38						1,929.28		
(b) Machinery	867.07			87.63						325.67		
(c) Miscellaneous	446.36			463.64						1,663.38		
62. Renewals or additions to outfit	1,959.36			18.15						1,188.38		
63. Ordinary repairs:												
(a) Hull	373.30									300.95		
(b) Machinery	809.35			2,574.29						600.61		
64. Laundry, ice, miscellaneous	224.88			74.98						207.25		
65. Total		$16,794.24			$11,135.00						$22,156.73	
Towboats.												
66. Operating cost for year	13,447.49			8,551.42						10,908.98		
67. Ordinary repairs	395.42			1,445.13						150.57		
68. Total		13,842.91			9,996.55						11,059.55	
Launch.												
69. Operating cost for year				390.00								
70. Ordinary repairs				34.71								
71. Total					424.71							
Barges and scows.												
72. Ordinary repairs	179.48			855.86						18.00		
73. Total		179.48			855.86						18.00	
74. Total field cost			$30,816.63			$22,412.12						$33,234.28
Gross cost.												
75. Office expenses, superintendence, surveys, etc						1,456.09						3,750.80
76. Extraordinary repairs to dredge:												
(a) Hull			58.62									73.12
(b) Machinery			1,647.56									3,650.97
77. Extraordinary repairs to towboats and launches												180.12
78. Extraordinary repairs to barges and scows			351.29									
79. Grand total			32,874.10			23,868.21						40,889.29

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Cincinnati.*	*Davenport.*	*Frankfort,*	*Gaillard, Col. D. D.*
COST OF WORK—continued.				
Cost per cubic yard.				
80. Field cost per cubic yard:				
(*a*) Mud or sand and gravel	$0.248			15.76 cents.
(*b*) Rock		$0.270		
81. Gross cost per cubic yard:				
(*a*) Mud or sand and gravel	$0.263			19.4 cents.
(*b*) Rock		$0.288		
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons	530.2	258		830.
83. Fuel consumed by auxiliary plant in long tons	987.3	445		473.6.
84. Cost per hour of effective working time	$51.50	$29.14		$10.79 for 864.5 hours.
85. Cost of fuel per ton	$4.91 (dredge); $4.22 (towboat)	$5.07		$6.10 to $9.65.
86. Number of days in commission	241	151		203.
87. Number of shifts worked per day	1	1	1	1.
			Remarks.	*Remarks.*
			The dredge Frankfort was out of commission during the entire calendar year.	Dredge began work May 15 and discontinued work Dec. 4, 1917. Dredging during the season was for maintenance, mostly scraping.

Name, letter, or number	*Green River.*	*Illinois.*	*Kentucky.*	*Keokuk.*
1. District	Louisville, Ky	Chicago, Ill	Chattanooga, Tenn	Rock Island, Ill.
2. Length	112 feet	98 feet	100 feet	110 feet.
3. Beam	31 feet	34 feet	34 feet	40 feet.
4. Depth	4 feet	8 feet	Forward 6 feet 10 inches; aft 5 feet 8 inches.	6 feet.
5. Draft:				
(a) Forward	2 feet 9 inches	4 feet 4 inches	4 feet	3 feet 6¼ inches.
(b) Aft	do	3 feet 4 inches	3 feet	2 feet 10¼ inches.
6. Displacement	268 long tons	280 tons	326 long tons	348 long tons.
7. Builder:				
(a) Hull and material of hull	United States; wood	United States; wood	Bucyrus Co.; material wood	Rock Island Bridge & Iron Works.
(b) Machinery	The Bucyrus Co	Marion-Osgood Co	Bucyrus Co	Marion-Osgood Co.
8. Where built	Rebuilt; Spottsville, Ky. (hull repaired, 1908).	Peoria, Ill	Paducah, Ky	Rock Island, Ill.
9. When built	1896	1914	1900; rebuilt 1914 by United States.	1913-14.
10. Time to build	No record	1 year	Unknown	1 year.
11. Contract cost	$4,093.69 [1]		$34,300	
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	No record	$33,660.25	$36,300	$56,454.
13. Bucket:				
(a) Type	Dipper	Bottom dump; dipper	Dipper	Dipper.
(b) Capacity	1¼ cubic yards	3 cubic yards	2 cubic yards rock, 4 cubic yards mud and sand.	2 yards.
14. Length of boom	50 feet	44 feet	45 feet	45 feet.
15. Maximum dredging depth	12 feet	20 feet	16 feet	18 feet.
16. Dimensions of main hoisting-engine cylinders.	8 by 12 inches	12 inches by 16 inches	12 by 16 inches	12 by 16 inches.
17. Dimensions of swinging engine	None	8 by 8 inches	8 by 10 inches	8 by 8 inch stroke.
18. Boilers:				
(a) Number	1	1	1	1.
(b) Type	Fire box	Locomotive	Locomotive	Locomotive fire box.
(c) Dimensions	40 inches by 13 feet 6 inches	66 inches by 20½ feet	60 inches diameter, 21 feet long	6 feet 6 inches by 20 feet 6 inches long.
(d) Number, diameter, and length of tubes in one boiler.	34; 3 inches by 8 feet 6 inches	110, 3-inch diameter; 13 feet 6 inches long.	88 tubes; 3 inches diameter, 14 feet long.	256; 3-inch flues; 13 feet long.
(e) Heating surface (total)	376 square feet	1,204 square feet	985 square feet	1,620 square feet.
(f) Grate surface (total)	15 square feet	28 square feet	22 square feet	45.5 square feet.
19. Working steam pressure	100 pounds	125 pounds	125 pounds	150 pounds.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Green River.*	*Illinois.*	*Kentucky.*	*Keokuk.*
ATTENDANT PLANT.				
Towboats.				
20. Name of tug attached to dredge	Snagboat Mammoth Cave [1]	Comanche and Pearl	McPherson and Colbert	Emily.
21. Owner	United States	United States	U. S. Engineer Department	United States.
22. Number of crew	15	Comanche 10; Pearl 5	10 to each shift	5.
Launches.				
23. Name	Echo River	La Salle	No. 6	None.
24. Number of crew	1	1	1	
Scows.				
25. Number of scows in use	2	3	3	2.
26. Type	Bottom dump	Side dump	Side dump	Side dump.
27. Capacity (each)	200 cubic yards	1, 80 cubic yards; 2, 100 cubic yards.	150 cubic yards	80 cubic yards.
28. Identifying letter or number	Nos. 1 and 2, Green and Barren Rivers.	13, 14, and 15	4-R, 10 and 13, Indian and Big Bend Shoals.	Nos. 15 and 16.
WORK PERFORMED.				
29. Location of dredging	At Locks 1, 2, 3, 4, and 5, Green River, and at two bars in Barren River.	Bars in Illinois River	Colbert Shoals Canal, Riverton Lock approach.	Hamburg, Ill., to Missouri River.
30. Average depth before dredging	4 feet	4 feet below low water	2, 3, and 4 feet	2 to 4 feet below low water.
31. Average depth after dredging	9 feet	7½ feet below low water	6 feet	8 feet below low water.
32. Average width of cut	36 feet	30 feet	37½ feet single cut	45 feet.
33. Total distance cut ahead by dredge, in feet.			20,985	2,425.
34. Total amount dredged in cubic yards during year:				
(a) Rock, (1) unit cost	2,468 } $0.125			(a) 11,363.7 [1]; (1) $0.5121.
(b) Sand and mud, (2) unit cost	35,750 }	(b) 137,004; (2) 15.2 cents		(b) 15,740.6; (2) $0.1673.
35. Average number of cubic yards dredged:				
(a) Per day	500	1,269		459.38.
(b) Per hour	63	192		87.43.
36. Maximum number of cubic yards dredged:				
(a) In one day	600	2,121	1,080	760.8 rock; 1,550 sand and mud.
(b) In one hour	80	311	148	98.1 rock; 193.75 sand and mud.

37. Average number of hours worked per day.	8	6.4	6	5.2.
38. Total number of days upon which any dredging was done.	121	108	130	59.
39. Average distance in miles from work to dump.	⅓	⅛	½	½.
40. Number of scows loaded during year.	505	1,389	397	273.
41. Number of scows loaded per day	7	13	300	4.6.
42. Average time to load one scow	1 hour	30	35 minuted to 1 hour and 10 minutes.	1.13 hours.
43. Average load in cubic yards per scow.	75	92.6		60.6.
44. Average time to tow load to dump and return.	¾ hour	20 minutes	30 minutes to 1 hour	1¼ hours.
45. Number of scows per tow	1	1	1	1.
46. Character of dredged material and average percentage:				
(a) Mud	93.5 (includes sand and gravel)	60 per cent		58.07 per cent (includes sand and gravel).
(b) Rock	6.5			41.93 per cent.[1]
(c) Sand		40 per cent		

Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
47. Dredging	664		694	40	896		310	
48. Handling scows	22				43			
49. Spudding up	41				84			
50. Miscellaneous	455				[1] 494			
Distribution of time lost in hours.								
51. Repairing:								
(a) Hull	30		8	25				
(b) Machinery	49		33	10	40		139	
52. Bad weather	307		8		886		4	
53. Changing location of plant	105		159		29		61	
54. Delays	87		168		11		150	
55. Sundays and holidays	1,584		1,416		1,472		360	
56. Out of commission	5,416		4,128		4,824		6,408	
57. Miscellaneous			2,144		9		1,328	
58. Total number of hours in year.	8,760		8,760		8,760		8,760	

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Green River.*		*Illinois.*		*Kentucky.*		*Keokuk.*	
COST OF WORK.								
Dredge.								
59. Pay roll	$4,143.50		$3,711.84		$4,536.89		$1,976.77	
60. Coal	259.46		609.00		1,207.20		724.22	
61. Supplies:								
(a) Subsistence	....		556.11		1,216.55		696.62	
(b) Machinery	35.13		11.80		128.80		702.98	
(c) Miscellaneous	190.40		8.17		112.00		448.56	
62. Renewals or additions to outfit	....		....		189.14		....	
63. Ordinary repairs:								
(a) Hull	....		185.98		197.70		187.85	
(b) Machinery	77.29		569.68		1,536.16		721.38	
64. Laundry, ice, miscellaneous	96.65		170.99		....		32.58	
65. Total		$4,802.43		$5,823.57		$9,124.44		$5,490.96
Towboats.								
66. Operating cost for year		....	8,329.08		1,637.44		1,883.85	
67. Ordinary repairs		....	464.42		1,236.00		402.49	
68. Total		....		8,793.50		2,873.44		2,286.34
Launch.								
69. Operating cost for year		....	105.00		16.70		....	
70. Ordinary repairs		....	29.74		.69		....	
71. Total		....		134.74		17.39		....
Barges and scows.								
72. Ordinary repairs		....	2,120.94		[2] 237.16		40.96	
73. Total		....		2,120.94		237.16		40.96
74. Total field cost		$4,802.43		$16,872.75		$12,252.43		$7,818.26
Gross cost.								
75. Office expenses, superintendence, surveys, etc		...		1,997.47		[1] 1,173.74		633.04

76. Extraordinary repairs to dredge:				
(a) Hull	....	121.00	....	....
(b) Machinery	....	....	....	....
77. Extraordinary repairs to towboats and launches	....	413.09	196.38	....
78. Extraordinary repairs to barges and scows	....	1,422.52	....	....
79. Grand total	4,802.43	20,826.83	13,622.55	8,452.20
Cost per cubic yard.				
80. Field cost per cubic yard:				
(a) Mud or sand	$0.125	$0.123	....	$0.1535.
(b) Rock			....	$0.4754.
81. Gross cost per cubic yard:				
(a) Mud or sand	$0.125	$0.152	....	$0.1673.
(b) Rock			....	$0.5121.
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons.	153	376	363.4	166.25.
83. Fuel consumed by auxiliary plant in long tons.	....	426	....	90.79.
84. Cost per hour of effective working time	....	$14.85	$12.19	$27.265.
85. Cost of fuel per ton	$1.70	$1.75, $2, $2.40	$3.32	$4.463.
86. Number of days in commission	286	167	211	96 (including Sundays and holidays).
87. Number of shifts worked per day	1	....	2	1.
	Remarks.		*Remarks.*	*Remarks.*
	[1] Not including cost of machinery transferred from old dredge. [2] The dredge has no regular tender; it is towed to its place of work by the snag boat Mammoth Cave when available, after which it and its scows are moved by the dredge crew. At other times, when available, scows are moved by the snag boat and the motor boat Echo River.		Drill units Nos. 3-S, 4-S, and 37. Costs not included in above operations. [1] Serving as drill tender. [2] Includes quarter-boat repairs. [3] Includes field office, Nashville and Cincinnati office expenses.	Employed on work of dredging Alton Slough (Mo.); steamboat landing at Hamburg, Ill., and removing old dams and shore protection vicinities of Sandy Island, Portage des Sioux, Mo., and Alton, Ill. [1] Material removed from old dams and contained 20 to 50 per cent sand and brush.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Kewaunee.*	*Kwasind.*	*Louisville.*	*Marietta.*
1. District	Milwaukee, Wis.	Chattanooga, Tenn.	Louisville, Ky.	First, Cincinnati, Ohio.
2. Length	100 feet	80 feet	67 feet	112 feet on deck.
3. Beam	34 feet	28 feet	28 feet 6 inches	34 feet.
4. Depth	9 feet	6 feet 6 inches	6 feet	6 feet 10 inches on center line.
5. Draft:				
(a) Forward	6 feet 2 inches	3 feet 3 inches	3 feet 4 inches	3 feet.
(b) Aft	3 feet 10 inches	3 feet	3 feet	Do.
6. Displacement	442½ long tons	187 long tons	127.6 long tons	297 long tons at 3 feet draft.
7. Builder:				
(a) Hull and material of hull	Marion Steam Shovel Co.; composite.	Osgood Dredge Co.; wood	Burnett & Co.; iron	Dubuque Boat & Boiler Works; steel and iron.
(b) Machinery	Marion Steam Shovel Co	do	Vulcan Iron Works	Dubuque Boat & Boiler Works; United States design.
8. Where built	Milwaukee, Wis.	Hull, Knoxville, Tenn.; rebuilt at Chattanooga, Tenn.	Cincinnati, Ohio	Dubuque, Iowa.
9. When built	1913	Rebuilt 1915	1886	1914–15.
10. Time to build	10 months		4 months	19.4 months.
11. Contract cost	$47,750	$11,000	$25,000	$64,414.
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	$50,000	$12,500	No record	$73,397.93.
13. Bucket:				
(a) Type	Dipper	Dipper	Dipper	Messable, manganese steel.
(b) Capacity	Sand, 4 cubic yards; rock, 2 cubic yards.	1½ cubic yards	2 cubic yards	2.5 cubic yards.
14. Length of boom	45 feet	38 feet	30 feet (crane)	Crane, 24.8 feet from center.
15. Maximum dredging depth	25 feet	9 feet	16 feet	15 feet open channel; 18 to 20 feet harbor.
16. Dimensions of main hoisting-engine cylinders.	14 inches by 16 inches	9 feet 10 inches	Double cylinder, 10 by 15 inches.	12 inches diameter by 16 inches stroke.
17. Dimensions of swinging engine	9 by 9 inches	5 by 6 inches	18 inches by 8 feet swinging ram.	18 inches diameter by 7.5 feet stroke.
18. Boilers:				
(a) Number	1	1	1	1 main; 1 auxiliary.
(b) Type	Scotch marine	Locomotive	Scotch marine (water back)	Lyons' combined fire and water tube (main).
(c) Dimensions	9 feet 6 inches diameter; 16 feet 4 inches long.	4 by 18½ feet long	6½ feet by 10 feet 7½ inches	60 inches diameter by 14 feet long (main).
(d) Number, diameter, and length of tubes in one boiler.	108; 3½ inches outside diameter; 11 feet 9 inches long.	56; 3 inches diameter, 12 feet long.	94; 3 inches by 8 feet	68; 3½ inches, fire tubes; 14 4-inch water tubes, all 14 feet long.
(e) Heating surface (total)	1,420 square feet	605.4 square feet	591 square feet	
(f) Grate surface (total)	40 square feet	17.5 square feet	17 square feet	27 square feet.
19. Working steam pressure	130 pounds	125 pounds	135 pounds	150 pounds (main and auxiliary).

ATTENDANT PLANT.				
Towboats.				
20. Name of tug attached to dredge	Industry	Hiwassee and Ocoee	Cherokee	Ottawa.
21. Owner	United States	U. S. Engineer Department	United States	United States.
22. Number of crew	4 single; 8 double	5 to each shift	9	9.
Launches.				
23. Name		Nos. 2 and 3		
24. Number of crew		1		
Scows.				
25. Number of scows in use	2	5	6	2.
26. Type	Center dump	Side dump	Bottom dump	Steel, side dump.
27. Capacity (each)	280 cubic yards	75 cubic yards	100 and 150 cubic yards	125 cubic yards.
28. Identifying letter or number	No. 7 and No. 8	4, 6–8, 14–16, 17, and 18	17, 18, 19, 20, 21, and 22	Nos. 9 and 10.
WORK PERFORMED.				
29. Location of dredging	Harbors, west shore of Lake Michigan.	Sale Creek, Hales Bar Approach, Hales Bar Pool, North Chickamauga Shoals.	Louisville & Portland Canal	Ohio River improvement.
30. Average depth before dredging	17 feet	2 feet, 3 feet, and 4 feet	7 feet 3 inches	1.5 feet above low water.
31. Average depth after dredging	22 feet	3½ and 6 feet	12 feet 2 inches	3 feet below low water.
32. Average width of cut	40 feet		25 feet	32 feet.
33. Total distance cut ahead by dredge, in feet.	65,150 feet	17,208	39,315	19.053.
34. Total amount dredged in cubic yards during year:				
(a) Rock (1) Unit cost		(a) 20.176; (1) $0.57	2,065 } $0.1624	(a) No. 7—51.75 tons; (1) $4.76.
(b) Sand and mud. (2) Unit cost	(b) 355,090 cubic yards; (2) 11.6 cents.	(b) 7,470; (2) $1.02	110,925 }	(b) 114,756; (2) $0.228.
35. Average number of cubic yards dredged:				
(a) Per day	2,796 cubic yards	244	631.22	$311.44.
(b) Per hour	239 cubic yards	38	109.22	$38.93.
36. Maximum number of cubic yards dredged:				
(a) In one day	5,600 cubic yards	600	1,575; two shifts	2,000.
(b) In one hour	360 cubic yards	80	204	300.
37. Average number of hours worked per day.	11 hours, 43 minutes	6	7	8.
38. Total number of days upon which any dredging was done.	127 days	113	195	109.
39. Average distance in miles from work to dump.	1 mile	½ to 1½ miles	1.6	¾ to 1½.
40. Number of scows loaded during year	1,256	613	913	1,175.
41. Number of scows loaded per day	9.9, average	5	5.15	11.
42. Average time to load one scow	1 hour 20 minutes	¾ to 2 hours	1 hour 7 minutes	30 minutes.
43. Average load in cubic yards per scow	280		123.65	98.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Kewaunee.*		*Kwasind.*		*Louisville.*		*Marietta.*	
WORK PERFORMED—continued.								
44. Average time to tow load to dump and return.	45 minutes		20 minutes to 1½ hours		1 hour 18 minutes		35 minutes.	
45. Number of scows per tow	1		1 and 2		1 to 4		1.	
46. Character of dredged material and average percentage:								
(a) Mud	50 per cent				98.2		5.	
(b) Rock			74 per cent		1.8		60.	
(c) Sand	50 per cent		26 per cent				35.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
Distribution of effective working time in hours.								
47. Dredging	1,262		711	30	1,034	30	680	
48. Handling scows	103	23	160	30			4	
49. Spudding up	119	40	86		41	50		
50. Miscellaneous	3	15	[1]439		299	30	17	
Distribution of time lost in hours.								
51. Repairing:								
(a) Hull			216		18	10		
(b) Machinery	365	6	221		440	35	143	
52. Bad weather	412	42	680				1,185	
53. Changing location of plant	21	48	215		127	10	82	
54. Delays	1,832		766		62	15	153	
55. Sundays and holidays	644		1,512		1,232		864	
56. Out of commission	3,480		3,784		5,193		3,480	
57. Miscellaneous	516	6	17		311		2,148	
58. Total number of hours in year	8,760		8,760		8,760		8,760	
COST OF WORK.								
Dredge.								
59. Pay rolls	$10,853.51		$4,290.82		$5,750.25		$6,910.32	
60. Coal	6,922.20		1,073.19		1,085.55		1,509.63	
61. Supplies:								
(a) Subsistence	2,472.80		1,463.58				2,281.22	
(b) Machinery	251.80		413.91		[illegible]		[illegible]	
(c) Miscellaneous	[illegible]		[illegible]		[illegible]		[illegible]	

62. Renewals or additions to outfit	12[illegible].96			....			316.44			2,243.76		
63. Ordinary repairs:												
(a) Hull	651.75			293.20			198.00			188.81		
(b) Machinery	2,873.71			1,839.47			2,461.65			359.10		
64. Laundry, ice, miscellaneous	326.98			145.10			17.74			215.41		
65. Total		25,431.34			$10,039.79			[1] $10,590.71			$14,875.06	
Towboats.												
66. Operating cost for year	12,951.13			2,698.68			7,223.03			11,143.23		
67. Ordinary repairs	461.80			486.89			551.73			379.52		
68. Total		13,412.93			3,185.57			7,774.76			11,522.75	
Launch.												
69. Operating cost for year	....			288.04			....			....		
70. Ordinary repairs	....			42.89			....			....		
71. Total		....			330.93			....			....	
Barges and scows.												
72. Ordinary repairs	266.46			[2] 1,219.03			392.50			75.65		
73. Total		266.46			1,219.03			392.50			75.65	
74. Total field cost			$39,110.73			[4] $18,890.34			$18,757.97			$26,473.46
Gross cost.												
75. Office expenses, superintendence, surveys, etc.			2,068.36			[3] 1,298.68			....			....
76. Extraordinary repairs to dredge:												
(a) Hull			2,035.00			2,480.09			977.56			....
(b) Machinery			221.50			1,635.02			1,305.40			2,128.31
77. Extraordinary repairs to towboats and launches.			....			....			905.33			....
78. Extraordinary repairs to barges and scows.			....			....			....			351.29
79. Grand total			43,435.59			[4] 24,304.13			21,946.26			28,953.06
Cost per cubic yard.												
80. Field cost per cubic yard:												
(a) Mud or sand	11.01 cents			0.31			$0.1624			$0.228.		
(b) Rock				0.34 and 1.58						$4.76 (per ton).		
81. Gross cost per cubic yard:												
(a) Mud or sand	12.23 cents			0.52			$0.1906			$0.25+.		
(b) Rock				0.57 and 2.60						$4.92 (per ton).		

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Kewaunee.*	*Kwasind.*	*Louisville.*	*Marietta.*
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons.	971.75 long tons	311.7	312	301.1.
83. Fuel consumed by auxiliary plant in long tons.	478.00 long tons		557	556.1.
84. Cost per hour of effective working time	$29.18	$14.46	$7.40	$40.22+
85. Cost of fuel per ton	$6.36 per net ton	3.44	$4.155	45 13 (dredge); $4.92 (towboat).
86. Number of days in commission	220	212	195	219.
87. Number of shifts worked per day	2	2	1	1.
		Remarks.	*Remarks.*	
		Drill units Nos. 1-T and 35. Costs not included in above operation. [1] Pulling trees, Hales Bar Pool. [2] Includes quarterboat and shopboat repairs. [3] Includes field, Nashville and Cincinnati office expenses. [4] Includes snagging operations.	[1] $407.71 of this amount chargeable to work other than dredging.	

Name, letter, or number	*Maumee.*	*Nolichucky.*	*Nolin River.*	*Ohio.*
1. District	Cleveland, Ohio	Chattanooga, Tenn	Louisville, Ky	First, Cincinnati, Ohio.
2. Length	100 feet	84 feet 10 inches	88 feet 8 inches	110 feet (over all, 112 feet).
3. Beam	36.2 feet	30 feet	30 feet 8 inches	31 feet 6 inches.
4. Depth	11 feet	6 feet 9 inches	6 feet 6 inches	6 feet 8 inches.
5. Draft:				
(a) Forward	7.67 feet	3 feet 5 inches	4 feet	2 feet 11 inches.
(b) Aft	2.84 feet	3 feet 4 inches	2 feet 6 inches	Do.
6. Displacement	549 tons	211 tons	About 210 long tons	270 tons.
7. Builder:				
(a) Hull and material of hull	Miller & Murphy; rebuilt by the Toledo Shipbuilding Co.	U. S. Engineer Department; wood.	The Dravo Contracting Co.; steel.	Allen & Blaisdell, 1873; remodeled, iron, 1880.
(b) Machinery	Osgood Dredge Co., Albany, N.Y.	The Marion-Osgood Co	The Marion Steam Shovel Co	American Dredge Co.
8. Where built	Rebuilt at Toledo, Ohio	Muscle Shoals Canal, Ala	Hull, Pittsburgh, Pa.; house, Louisville, Ky.[1]	Hull, St. Louis, Mo.
9. When built	1894; rebuilt in 1909	1913	Hull, 1915; house, 1916	Original wood hull, 1873; present iron hull, 1880.
10. Time to build	Unknown	129 days	7 months	About 1 year.
11. Contract cost	Cost of rebuilding, $42,000	$11,604 (machinery)	$9.375 (hull)	$21,950.
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	$42,000	$27,011.65	$28,814.05	About $35,000.
13. Bucket:				
(a) Type	Bottom-dump dipper	Dipper	Dipper	Dipper.
(b) Capacity	5 cubic yards	1½ cubic yards	1¼ cubic yards	2.7 cubic yards.
14. Length of boom	42 feet	36 feet	40 feet	Crane 24 feet from center.
15. Maximum dredging depth	26 feet	14 feet	15 feet	Open channel, 15 feet; harbor, 18 to 20 feet.
16. Dimensions of main hoisting-engine cylinders.	2 cylinders; 14 by 20 inches	8½ by 10 inches	9 by 11 inches	12 inches diameter by 15 inches stroke.
17. Dimensions of swinging engine	2 cylinders; 8 by 10 inches	5 by 6 inches	6 by 7 inches	16 inches diameter by 8 feet 4 inches stroke.
18. Boilers:				
(a) Number	2	1	1	1.
(b) Type	Locomotive	Locomotive	Scotch marine	Roberts water tube.
(c) Dimensions	19 feet by 4 feet 8 inches	4 by 18 feet	6 feet 5 inches by 11 feet 4 inches	9 feet by 9 feet 7 inches by 7 feet 3 inches high.
(d) Number, diameter, and length of tubes in one boiler.	120; 3 inches by 12 feet	54; 3 inches diameter by 11½ feet long.	75; 3 inches by 9 feet 10½ inches	1¼, 1½, and 2½ inch pipe and coils.
(e) Heating surface (total)	1,269 square feet	585 square feet		
(f) Grate surface (total)	40 square feet	16.5 feet		42.8 square feet.
19. Working steam pressure	80 pounds	120 pounds	125 pounds	135 pounds.
ATTENDANT PLANT.				
Towboats.				
20. Name of tug attached to dredge	Spear	Chickamauga	([2])	Miami.
21. Owner	United States	U. S. Engineer Department		United States.
22. Number of crew	6	69 to each shift		9.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Maumee.*	*Nolichucky.*	*Nolin River.*	*Ohio.*
ATTENDANT PLANT—continued.				
Launches.				
23. Name		Toco		Mignon.
24. Number of crew		1		None.
Scows.				
25. Number of scows in use	2	2	2	2.
26. Type	Bottom dump	Side dump	Bottom dump	Steel, side dump.
27. Capacity (each)	500 cubic yards	75 cubic yards each	100 cubic yards	125 cubic yards.
28. Identifying letter or number	Nos. 4 and 5	6-R and 17	Nos. 21 and 22, L. P. C	Nos. 5 and 7.
WORK PERFORMED.				
29. Location of dredging	Cleveland Harbor	Coulter Island Shoals	Dam No. 43, Ohio River and Louisville and Portland Canal.	Ohio River improvement.
30. Average depth before dredging	17½ feet			1.25 feet above low water.
31. Average depth after dredging	21 feet			4 feet below low water.
32. Average width of cut	30 feet	30 feet		32 feet.
33. Total distance cut ahead by dredge, in feet.	1,510 feet	11,790 feet		16,383.
34. Total amount dredged in cubic yards during year:				
(*a*) Rock; (1) unit cost		(*a*) 6,020 feet; (1) $0.75	9,450 } $0.0525	(*a*) No. 34, 66.8 tons; (1) $8.58.
(*b*) Sand and mud; (2) unit cost	(*b*) 7,020; (2) $0.317	(*b*) 22,013 feet; (2) 60 cents	159,925 }	(*b*) 92,563; (2) $0.35+.
35. Average number of cubic yards dredged:				
(*a*) Per day	1,003	454	315, rock; 1,032, sand, mud, and gravel.	1,690.
(*b*) Per hour	195	57	13, rock; 63, sand, mud, and gravel	211.
36. Maximum number of cubic yards dredged:				
(*a*) In one day	2,000	145	750, rock; 1,400, sand, mud, and gravel.	2,296.
(*b*) In one hour	242	31	150, rock; 300, sand, mud, and gravel.	300.
37. Average number of hours worked per day.	5.13	4	16	8.
38. Total number of days upon which any dredging was done.	7	193	184	126.
39. Average distance in miles from work to dump.	½ mile	One-half, and part casted	1	¾ to 1½ miles.
40. Number of scows loaded during year	16	367	1,197	976.
41. Number of scows loaded per day	[illegible]	2	7	

42. Average time to load one scow	2¼ hours		1⅓ hours		30 minutes		30 minutes.	
43. Average load in cubic yards per scow	439				125		95.	
44. Average time to tow load to dump and return	30 minutes		2		1 hour		40 minutes.	
45. Number of scows per tow	1		1		1		1 and 2.	
46. Character of dredged material and average percentage:								
(a) Mud	100				94.42 (mud, sand, and gravel)		5.	
(b) Rock			22 per cent		5.58		60.	
(c) Sand			78 per cent				35.	
Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
47. Dredging	35	55	894		1,351		497	
48. Handling scows			82		78		160	20
49. Spudding up	2		85		82			
50. Miscellaneous			144				27	40
Distribution of time lost in hours.								
51. Repairing:								
(a) Hull	72				12			
(b) Machinery	[1]206	5	312		205		58	20
52. Bad weather			340		1,207		1,216	15
53. Changing location of plant			28		251		272	55
54. Delays	4	40			447		87	30
55. Sundays and holidays	408		1,444		840		524	
56. Out of commission	[1]6,216		4,568		3,972		3,902	
57. Miscellaneous	1,815	20	863		315		2,024	
58. Total number of hours in year	8,760		8,760		8,760		8,760	
COST OF WORK.								
Dredge.								
59. Pay rolls	$4,510.14		$3,928.69		$5,734.34		$10,108.38	
60. Coal	644.83		1,010.85		991.15		2,192.32	
61. Supplies:								
(a) Subsistence	1,011.19		1,405.66				1,908.97	
(b) Machinery	335.38		744.30		31.74		629.48	
(c) Miscellaneous	213.71		1,562.28		8.71		377.72	
62. Renewals or additions to outfit	136.15				147.16		1,451.62	
63. Ordinary repairs:								
(a) Hull	52.40		395.73		334.61		332.77	
(b) Machinery	624.68		2,092.84		1,522.13		912.04	
64. Laundry, ice, miscellaneous	50.85		44.30		61.38		246.37	
65. Total		$7,579.33		$11,184.65		$8,831.22		$18,159.67

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Maumee.*			*Nolichucky.*			*Nolin River.*			*Ohio.*		
COST OF WORK—continued.												
Towboats.												
66. Operating cost for year	$354.12			$1,962.91			....			$14,619.41		
67. Ordinary repairs	....			401.47			....			499.64		
68. Total		$354.12			$2,364.38			....			$15,119.05	
Launch.												
69. Operating cost for year	....			323.86			....			....		
70. Ordinary repairs	....			11.11			....			....		
71. Total		....			334.97			....			....	
Barges and scows.												
72. Ordinary repairs	....			[1] 175.87			$73.00			237.03		
73. Total		....			275.87			$73.00			237.03	
74. Total field cost			[2] $7,933.45			[2] $14,159.87			$8,904.22			$33,515.75
Gross cos..												
75. Office expenses, superintendence, surveys, etc.			800.00			2,414.68			....			13.83
76. Extraordinary repairs to dredge:												
(a) Hull			....			....			....			....
(b) Machinery			650.32			1,027.69			....			1,374.43
77. Extraordinary repairs to towboats and launches.			....			....			....			....
78. Extraordinary repairs to barges and scows.			7,947.63			....			....			....
79. Grand total			17,340.40			17,602.24			8,904.22			34,904.01
Cost per cubic yard.												
80. Field cost per cubic yard:												
(a) Mud or sand	$0.317			$0.47			$0.0622			$0.25+		
(b) Rock	....			$0.60 and $0.72						$5.58+		

81. Gross cost per cubic yard:				
(a) Mud or sand	$0.342 [3]	$0.58	$0.0525	$0.37+.
(b) Rock		$0.75 and $0.90		$8.94+
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons	106	52.25 long tons coal, 424 cords wood.	389	530.8.
83. Fuel consumed by auxiliary plant in long tons.	29			886.5.
84. Cost per hour of effective working time.	$58.70	$14.60		$70.23.
85. Cost of fuel per ton	$6.06	$4.55 coal, $1.82 wood (cord)	$2.55	$4.13 (dredge), $3.98 (auxiliary plant).
86. Number of days in commission	106	240	200	199.
87. Number of shifts worked per day	1	1	2	1.
	Remarks. [1] From Jan. 2 to Apr. 8, dredge was overhauled, repaired, and put in condition for the season's work. Dredge began operations on Apr. 9, and went out of commission Apr. 17 for the remainder of the year. [2] Scows calked in drydock and thoroughly repaired. [3] Costs per cubic yard are based on cost of operations for April.	***Remarks.*** Drill Unit No. 36; costs not included in above operations. [1] Includes quarter boat and shop boat repairs. [2] Includes field office, Nashville and Cincinnati office expenses.	***Remarks.*** [1] House and machinery installed by the United States. [2] The dredge has no regular tender; it is towed to its place of work by the towboat Shawnee, after which, if the Shawnee is not available it is moved by hand. The dredge was employed in excavating for cofferdams and in dredging material for concrete at Dam No. 43, Ohio River, and from June 7 to 26, and July 24 to 31, in dredging deposits from the Louisville and Portland Canal.	

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Oswego.*	*Phoenix.*	*Ravenswood.*[1]	*Sevier.*
1. District	First, Cincinnati, Ohio	St. Louis, Mo	Wheeling, W. Va	Nashville.
2. Length	92 feet (over all 94 feet)	80 feet	80 feet	80 feet.
3. Beam	31 feet 6 inches	30 feet	30 feet 6 inches (34 feet over all)	30 feet.
4. Depth	6 feet 1 inch	8 feet	6 feet 6 inches	7 feet.
5. Draft:				
(*a*) Forward	3 feet 3 inches	3 feet 6 inches	4 feet	2 feet 6 inches.
(*b*) Aft	3 feet 3 inches	4 feet 3 inches	3 feet	3 feet 11 inches.
6. Displacement	235 tons	309 tons	238 tons	200 tons.
7. Builder:				
(*a*) Hull and material of hull	Allen & Blaisdell; new bottom plating 1909.	A. cutting; wood	McKeesport Saw Mill Co.; wood.	Featherstone Foundry & Machine Co.
(*b*) Machinery	Original Vulcan Iron Works; remodeled 1899.	Osgood Dredge Co., Albany, N. Y.	Bucyrus Co	Do.
8. Where built	St. Louis, Mo	Metropolis, Ill	McKeesport, Pa	Jeffersonville, Ind.
9. When built	1883	1885	1902	1903.
10. Time to build	6 months	9 months	5 months	8 months.
11. Contract cost	$19,750 (hull)	$16,600		$18,650.
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	About $35,000	$19,525	$23,000	$18,900.
13. Bucket:				
(*a*) Type	Dipper	Dipper	Dipper	Dipper.
(*b*) Capacity	2.7 cubic yards	1 cubic yard	2½ cubic yards	1¼ cubic yards.
14. Length of boom	Crane 23.75 feet from center	34 feet	40 feet	45 feet.
15. Maximum dredging depth	15 feet open channel; 18 to 20 feet harbor.	17 feet	21 feet	19 feet.
16. Dimensions of main hoisting-engine cylinders.	12 inches diameter by 15 inches stroke.	12 by 18 inches	12 by 14 inches	8-inch bore, 12-inch stroke.
17. Dimensions of swinging engine	16 inches diameter by 8 feet 4 inches stroke.	7 by 10 inches	7 by 7 inches	6-inch bore, 10-inch stroke.
18. Boilers:				
(*a*) Number	1	1	1	1.
(*b*) Type	Robert water tube	Fire box	Horizontal, fire-box tube	Locomotive.
(*c*) Dimensions	6 feet 9 inches by 10 feet 3 inches by 10 feet high.	15 feet 4 inches by 5 feet	5 feet diameter, 21 feet 6 inches long.	42 inches by 12 feet 6 inches.
(*d*) Number, diameter, and length of tubes in one boiler.	1¼, 1½, and 2½ inch coils and tubes.	86; 3 inches; 10 feet	88; 3 inches; 14 feet	54; 2¼ inches; 7 feet 3 inches.
(*e*) Heating surface (total)		1,075 square feet	1,094 square feet	283 square feet.
(*f*) Grate surface (total)	45.33 square feet	22 square feet	22½ square feet	10.4 square feet.
19. Working steam pressure	135 pounds	125 pounds	125 pounds	100 pounds.

ATTENDANT PLANT.				
Towboats.				
20. Name of tug attached to dredge	Guyandot	Salvisi, Kaskaskia, and Meramec	Crozet	Steamer Henry.
21. Owner	United States	U. S. Engineer Office, St. Louis.	United States	U. S. Engineer Department.
22. Number of crew	9	6	7	5.
Launches.				
23. Name	None	None	Alto	
24. Number of crew			3	
Scows.				
25. Number of scows in use	2	9 flats	2	1.
26. Type	Steel, side dump	Steel-deck flats, 16 by 55 feet	Side dump (wood)	Side dump.
27. Capacity (each)	125 cubic yards	20 yards each	100 cubic yards	80 cubic yards each.
28. Identifying letter or number	Nos. 6 and 8	None	U. S. Engineer Department Wheeling, Nos. 41 and 42.	
WORK PERFORMED.				
29. Location of dredging	Ohio River improvement	(Bar) Grand Tower (104)	At and near Dam No. 21, Ohio River, and Dam No. 27, Ohio River.	Locks C and D, Cumberland River.
30. Average depth before dredging	1.25 feet above low water	8 feet		Lock C, 8 feet; Lock D, 3 feet.
31. Average depth after dredging	4 feet below low water	12 feet		
32. Average width of cut	32 feet	25 feet		35 feet.
33. Total distance cut ahead by dredge, in feet.	20,143	1,000		2,100 feet single cut.
34. Total amount dredged in cubic yards during year:				
(a) Rocks; (1) unit cost	(a) No. 14, 33.06 tons; (1) $8.52	(a) 2,150; (1) $2.66	(a) None	
(b) Sand and mud; (2) unit cost	(b) 107,025; (2) $0.29+	(b) 2,150; (2) $2.66	(b) 94,965 (gravel); (2) 18.6 cents.	(b) 11,960, at 33 cents, mud, sand, and gravel.
35. Average number of cubic yards dredged:				
(a) Per day	1,650	82.7	1,055	171.
(b) Per hour	207	12.1	214	38.
36. Maximum number of cubic yards dredged:				
(a) In one day	1,840	170	1,800	500.
(b) In one hour	300	30	225	100.
37. Average number of hours worked per day.	8	11.3	4.9	4.5.
38. Total number of days upon which any dredging was done.	102	52	90	70.
39. Average distance in miles from work to dump.	¾ to 1½	¼	½	¼.
40. Number of scows loaded during year	1,172	276	949	154.
41. Number of scows loaded per day	11	5.3	10.9	2.2.
42. Average time to load one scow	27 minutes	1 hour	45 minutes	1 hour.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Oswego.*		*Phoenix.*		*Ravenswood.*		*Sevier.*	
WORK PERFORMED—continued.								
43. Average load in cubic yards per scow	92		15		100		77.	
44. Average time to tow load to dump and return	35 minutes		45 minutes		30 minutes		30 minutes.	
45. Number of scows per tow	1 and 2		1-3		1		1.	
46. Character of dredged material and average percentage:								
(*a*) Mud	5		35 (gravel)		10 per cents			
(*b*) Rock	60		15 (bowlders)		50 per cent (gravel)			
(*c*) Sand	35		50		40 per cent			
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
Distribution of effective working time in hours.								
47. Dredging	516	45	336	30	445		314	
48. Handling scows	152	15			160		57	
49. Spudding up			20		50		28	
50. Miscellaneous	31	55			242		10	
Distribution of time in lost hours.								
51. Repairing:								
(*a*) Hull					306			
(*b*) Machinery	77	45	643	15	1,000		92	
52. Bad weather	1,172	30	16	15			305	
53. Changing location of plant	365	35	19		20		192	
54. Delays	45	15	53					
55. Sundays and holidays	624		184		400		1,472	
56. Out of commission	3,984		5,784		297		4,848	
57. Miscellaneous	1,790		1,704		5,840		1,442	
58. Total number of hours in in year.	8,760		8,760		8,760		8,760	
COST OF WORK.								
Dredge.								
59. Pay rolls	$9,229.43		$4,411.93		$7,425.24		$2,741.15	
60. Coal	2,290.92		860.95		2,045.76		289.08	

61. Supplies:												
(a) Subsistence	1,307.17			1,919.55			....			618.71		
(b) Machinery	590.69			77.63			241.77			102.84		
(c) Miscellaneous	315.74			83.76			858.61			11.20		
62. Renewals or additions to outfit	1,400.11			....			....			....		
63. Ordinary repairs:												
(a) Hull	338.59			21.56			398.81			....		
(b) Machinery	349.91			1,480.71			4,711.37			77.61		
64. Laundry, ice, miscellaneous	208.44			198.27			147.69			....		
65. Total		$16,031.00			$9,054.36			$16,429.25			$3,841.19	
Towboats.												
66. Operating cost for year	15,126.07			2,335.88			(2)			114.65		
67. Ordinary repairs	376.05			41.32			....			....		
68. Total		15,502.12			2,377.20			....			114.65	
Launch.												
69. Operating cost for year	....			....			....			....		
70. Ordinary repairs	....			....			....			....		
71. Total		....			....			....			....	
Barges and scows.												
72. Ordinary repairs	251.45			....			176.98			....		
73. Total		251.45			....			176.98			....	
74. Total field cost			$31,784.57			$11,431.56			$16,606.23			$3,955.84
Gross cost.												
75. Office expenses, superintendence, surveys, etc.			1.40			3,023.25			....			....
76. Extraordinary repairs to dredge:												
(a) Hull			288.87			....			....			6,894.28
(b) Machinery			1,008.25			....			1,045.00			....
77. Extraordinary repairs to towboats and launches.			....			....			....			....
78. Extraordinary repairs to barges and scows.			....			....			....			....
79. Grand total			33,083.09			[1] 14,454.75			17,651.23			10,850.12

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Oswego.*	*Phoenix.*	*Ravenswood.*	*Sevier.*
Cost per cubic yard.				
80. Field cost per cubic yard:				
(*a*) Mud or sand	$0.29+	$2.66	17.5 cents	33 cents, mud, sand, and gravel.
(*b*) Rock	$8.52+(per ton)	$2.66		
81. Gross cost per cubic yard:				
(*a*) Mud or sand	$0.31+	$3.36	18.6 cents	
(*b*) Rock	$8.87+(per ton)	$3.36		
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons.	543	251.2	640	63.
83. Fuel consumed by auxiliary plant in long tons.	1,192	278		
84. Cost per hour of effective working time	$64.02	$40.60	$19.68	$9.67.
85. Cost of fuel per ton	$4.22 (dredge); $3.93 (towboat)	$3.06	$3.70	$4.60.
86. Number of days in commission	199	124	328	104.
87. Number of shifts worked per day	1	2	1	1.
		Remarks.	*Remarks.*	*Remarks.*
		[1] Includes charges for proportional part of the expenses of care of idle plant, materials, etc.	This plant was employed in construction of Dam No. 21, Ohio River. [1] Formerly Southern. [2] See report for Crozet.	This boat was not operated in connection with any drill unit. For first part of year was idle at Locks B and A; worked a short time at Lock D and was then taken to Lock C, where it was used the balance of the year when working. The time of the crew while boat was idle is charged in above operations although part of the time the crew were helping with other work. New hull has been constructed for this boat at Lock A, Cumberland River, but has never been put into service.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Sodus.*	*St. Paul.*	*Tellico.*	*Tennessee.*
1. District	Buffalo, N. Y	Rock Island, Ill	Chattanooga, Tenn	Chattanooga, Tenn.
2. Length	100 feet	110 feet	80 feet	100 feet.
3. Beam	35 feet	40 feet	30 feet	34 feet.
4. Depth	Forward, 9 feet 8 inches; aft, 8 feet 9 inches.	6 feet	7 feet	6 feet 10 inches.
5. Draft:				
(a) Forward	5 feet 2 inches	3 feet 6½ inches	3 feet	63½ inches.
(b) Aft	2 feet	2 feet 10½ inches	2 feet 6 inches	40 inches.
6. Displacement	375 net tons	348 tons	170 long tons	390 tons.
7. Builder:				
(a) Hull and material of hull	U. S. Engineer Department; wood.	Rock Island Bridge & Iron Works	Marion-Osgood Co.; wood	U. S. Engineer Department; wood.
(b) Machinery	Marion Steam Shovel Co	Marion-Osgood Co	Marion-Osgood Co	Bucyrus Co.
8. Where built	Oswego, N. Y	Moline, Ill	Hull, Knoxville, Tenn.; machinery, Marion, Ohio.	Hull, Muscle Shoals Canal, Ala.
9. When built	December, 1910, to April, 1912	1913, 1914	May, 1912	1910.
10. Time to build	17 months	9 months	8 months	9 months.
11. Contract cost	Machinery, etc., $20,245	$23,612.52, hull	$16,248	$19,850, machinery.
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	$36,000	$56,130.56	$18,248	$37,513.
13. Bucket:				
(a) Type	Dipper (2)	Dipper	Dipper	Dipper.
(b) Capacity	One 4½ cubic yards, one 3.22 cubic yards.	2 cubic yards	1½ cubic yards	1½ cubic yards rock, 2 cubic yards mud, etc.
14. Length of boom	46 feet 6 inches	45 feet	35 feet	45 feet.
15. Maximum dredging depth	25 feet	18 feet	14 feet	16 feet.
16. Dimensions of main hoisting-engine cylinders.	14 by 26 inches	12 by 16 inches	8½ by 10 inches	10 by 14 inches.
17. Dimensions of swinging engine	8 by 8 inches	8 by 8 inches	5 by 6 inches	
18. Boilers:				
(a) Number	1	1	1	1.
(b) Type	Marine fire-tube	Locomotive	Locomotive	Locomotive fire tube.
(c) Dimensions	11 feet long by 6 feet 6 inches wide.	20 feet 6 inches long, 6 feet 6 inches diameter.	48 inches diameter, 18 feet 6 inches long.	66 inches diameter, 18 feet 6 inches long.
(d) Number, diameter, and length of tubes in one boiler.	148; 3 inches diameter, 8 feet 4½ inches long.	225, 2 inches diameter, 13 feet long.	54; 3 inches diameter, 11 feet 6 inches long.	112; 3 inches diameter, 13 feet long.
(e) Heating surface (total)	1,065 square feet	1,620 square feet	612.94 square feet	1,500 square feet.
(f) Grate surface (total)	39 square feet	45.5 square feet	18 square feet	25 square feet.
19. Working steam pressure	110 pounds	150 pounds	125 pounds	125 pounds.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Sodus.*			*St. Paul.*	*Tellico.*	*Tennessee.*
ATTENDANT PLANT.						
Towboats.						
20. Name of tug attached to dredge	Brewerton and Chippewa			Le Claire, Ruth, and Grace, intermittently.	Chilhowee	Lookout and King.
21. Owner	United States, A. R. Hinckley			United States	U. S. Engineer Department	U. S. Engineer Department.
22. Number of crew	4 on each tug			Ruth and Grace, 6 each; Le Claire, 11.	7 to each shift	Lookout 14, King 8, to each shift.
Launches.						
23. Name					No. 4	
24. Number of crew					2	
Scows.						
25. Number of scows in use	2			9	3	2.
26. Type	Dump			Flat	Side dump	Side dump.
27. Capacity (each)	230 cubic yards			100 tons	150 tons	75 cubic yards.
28. Identifying letter or number	Nos. 15 and 16			287, 288, 290, 292, 296, 299, 291, 242, 273.	8, 14, 15	
WORK PERFORMED.						
29. Location of dredging	Oswego.	Charlotte.	Great Sodus Harbor, N. Y.	Rock Island Rapids and Le Claire Canal.	Williams and Knoxville Shoals.	Riverton Lock approach, Tuscumbia Bar, Florence Bridge, Buck & Kogers Island.
	Feet.	*Feet.*	*Feet.*			
30. Average depth before dredging	12	19½	13½	2½ feet below low water	1½ feet and 2 feet 6 inches	4 to 5 feet.
31. Average depth after dredging	16	21	16	7 feet below low water	3½ feet	6 feet.
32. Average width of cut	40 feet			18 feet	30 feet	37½ feet.
33. Total distance cut ahead by dredge, in feet.	27,705			3,330	25,161	14,225 feet.
34. Total amount dredged in cubic yards during year: (*a*) Rock; (1) unit cost (*b*) Sand and mud; (2) unit cost	(*b*) 124,500; (2) 13.15 cents			(*a*) 20,427, solid measure; (1) 0.515 (*b*) 14,906; (2) 0.252	(*a*) 21,844; (1) 0.89 (*b*) 15,860; (2) 1.09	(*a*) 13,925; (1) 1.01. (*b*) 5,380; (2) 0.58.
35. Average number cubic yards dredged:						
(*a*) Per day	1,245			200 rock (solid mud), 720 sand and mud.	168	160.
(*b*) Per hour	104			26 rock (solid mud), 90 sand and mud	16	23.

36. Maximum number of cubic yards dredged:				
(a) In one day	1,840	275 rock (solid mud), 910 sand and mud.	465	450.
(b) In one hour	230	32 rock (solid mud), 114 sand and mud.	75	50.
37. Average number of hours worked per day.	6.42	8	10	6.
38. Total number of days upon which any dredging was done.	100	102 rock, 52 sand and mud	224	120.
39. Average distance in miles from work to dump.	¾	5 rock, 1 sand and mud	½ to 2 miles	1.
40. Number of scows loaded during year.	544¾	452 rock, 170 sand and mud	842	88, part casted.
41. Number of scows loaded per day	5.44	Average, 4 rock, 10 sand and mud	3	1.5.
42. Average time to load one scow	1 hour 10 minutes	1¼ hours for rock, ¾ hour sand and mud.	2 hours	1 hour and 3 hours, respectively
43. Average load in cubic yards per scow.	230	50 for rock, 72 for sand and mud.	35	56.
44. Average time to tow load to dump and return.	45 minutes	2½ hours for rock, ¾ hour for sand and mud.	½ to 1½ hours	30 minutes to 1 hour.
45. Number of scows per tow	1	1 to 2	1	1.
46. Character of dredged material and average percentage:				
(a) Mud	50 per cent			
(b) Rock		58	57 per cent	72.
(c) Sand	50 per cent	42	43 per cent	28, gravel.

	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
Distribution of effective working time in hours.								
47. Dredging	584		1,192		2,259	45	823	
48. Handling scows	18				80	7	34	
49. Spudding up	40				226	23	106	
50. Miscellaneous					57	30	19	
Distribution of time lost in hours.								
51. Repairing:								
(a) Hull	16				8	25		
(b) Machinery	41		32		176	48	32	
52. Bad weather	153	30			72	25	900	
53. Changing location of plant	87				187	30	40	
54. Delays	82				181	50		
55. Sundays and holidays	1,472		304		1,528		1,472	
56. Out of commission	6,217		4,176		3,432		4,632	
57. Miscellaneous	49	30	3,056		549	15	712	
58. Total number of hours in year	8,760		8,760		8,760		8,760	

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name	*Sodus.*		*St. Paul.*		*Tellico.*		*Tennessee.*	
COST OF WORK.								
Dredge.								
59. Pay rolls	$4,975.71		$2,348.08		$6,931.84		$4,908.55	
60. Coal	1,945.97		871.62		1,882.87		1,714.40	
61. Supplies:								
(a) Subsistence	1,137.10		579.00		2,305.73		1,476.70	
(b) Machinery	48.74		413.54		665.52		296.00	
(c) Miscellaneous	721.21		12.97		625.96		386.50	
62. Renewals or additions to outfit	874.80		12.30		1,497.05		....	
63. Ordinary repairs:								
(a) Hull	319.70		2.35		72.36		192.21	
(b) Machinery	464.95		1,075.07		2,671.18		1,334.41	
64. Laundry, ice, miscellaneous	633.02		2.30		65.20		99.70	
65. Total		$11,121.20		$5,317.23		$16,717.71		$10,408.47
Towboats.								
66. Operating cost for year	4,265.15		6,165.48		7,873.59		3,585.07	
67. Ordinary repairs	809.37		1,265.13		1,160.00		586.55	
68. Total		5,074.52		7,430.61		9,033.59		4,171.62
Launch.								
69. Operating cost for year	....		....		527.49		....	
70. Ordinary repairs	....		....		45.11		....	
71. Total		....		....		572.60		....
Barges and scows.								
72. Ordinary repairs	177.08		307.87		[1] 1,040.00		[1] 423.00	
73. Total		177.08		307.87		1,040.00		423.00
74. Total field cost		$16,372.80		$13,055.71		$27,363.90		$15,003.09

Gross cost.				
75. Office expenses, superintendence, surveys, etc.	1,668.71	664.06	[2]3,049.08	[2]1,686.62
76. Extraordinary repairs to dredge:				
(*a*) Hull	....	....	3,750.51	5,232.40
(*b*) Machinery	....	565.35	2,590.33	1,327.34
77. Extraordinary repairs to towboats and launches.	....	73.85	....	2,067.45
78. Extraordinary repairs to barges and scows.	....	....	....	2,600.66
79. Grand total	18,041.51	14,358.97	36,753.82	27,917.56
Cost per cubic yard.				
80. Field cost per cubic yard:				
(*a*) Mud or sand	13.15 cents per cubic yard	$0.229	$0.81	$0.31.
(*b*) Rock	....	$0.471	$0.66	$0.54.
81. Gross cost per cubic yard:				
(*a*) Mud or sand	14.5 cents per cubic yard	$0.252	$1.69	$0.58.
(*b*) Rock	....	$0.515	$0.89	$1.01.
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons.	338½	195.5	400	485.
83. Fuel consumed by auxiliary plant in long tons.	181⅓	595.5	....	
84. Cost per hour of effective working time	$28.10	$12.05	$14.01	$28.42.
85. Cost of fuel per ton	$5.75	$4.46	$4.70	$3.535.
86. Number of days in commission	167	191	225	84.
87. Number of shifts worked per day	1	1	2	2.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	There were no drill boats operated in connection with this dredge.	Mississippi River, Rock Island division, Le Claire Canal dredging sand and rock, Mile 349. Dredging rock, Mile 362. Nov. 24–26 leased to Interstate Material Co., Davenport, Iowa.	Drill Unit No. 1-B, costs not included in above operations. [1] Includes quarter boat and shop-boat repairs. [2] Includes field office, Nashville and Cincinnati office expenses.	Drill Unit No. 2-H and No. 1-H, costs not included in above operations. [1] Includes quarter-boat and shop-boat repairs. [2] Includes field, Nashville, and Cincinnati office expenses.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Tuscumbia.*	*Upatoi.*	*Vulcan.*	*Watauga.*
1. District	Chattanooga, Tenn.	Montgomery, Ala.	St. Louis, Mo.	Chattanooga, Tenn.
2. Length	100 feet	85 feet	80 feet	100 feet.
3. Beam	34 feet	30 feet	30 feet	34 feet.
4. Depth	6 feet 10 inches	6 feet	8 feet	Forward 7 feet 10 inches; aft 6 feet 10 inches.
5. Draft:				
(a) Forward	60 inches	3 feet	4 feet	5 feet 6 inches.
(b) Aft	36 inches	3 feet	3 feet 2½ inches	4 feet.
6. Displacement	375 tons	212 tons	240 tons	400 long tons.
7. Builder:				
(a) Hull and material of hull	U. S. Engineer Department, wood.	U. S. Engineer Department, wood.	Jacob Eckhart, Davenport, Iowa	U. S. Engineer Department; wood.
(b) Machinery	Vulcan Steam Shovel Co.	Marion Steam Shovel Co.	Osgood Dredge Co.	Bucyrus Co.
8. Where built	Machinery, Toledo, Ohio; hull, Muscle Shoals Canal.	Columbus, Ga.	Davenport, Iowa.	Hull, Muscle Shoals Canal, Ala.
9. When built	June, 1912.	1909	1883	1912.
10. Time to build	1 year	8 months	9 months	11 months.
11. Contract cost	Machinery, $20,000	$6,312.24	$19,450	Machinery, $25,500.
12. Finished cost with outfit (exclusive of scows, tugs, and launches)	$43,870.92	$15,717.74	$19,450	$49,327.16.
13. Bucket:				
(a) Type	Dipper	Dipper	Dipper	Dipper.
(b) Capacity	1½ cubic yards rock, 2 cubic yards mud, etc.	2 cubic yards	1¾ cubic yards	2 cubic yards rock; 4 cubic yards mud and sand.
14. Length of boom	45 feet	35 feet; steel	34 feet	45 feet.
15. Maximum dredging depth	16 feet	12 feet	17 feet	16 feet.
16. Dimensions of main hoisting-engine cylinders.	10 by 14 inches	10½ inches diameter; 12-inch stroke.	12 by 18 inches	12 by 16 inches.
17. Dimensions of swinging engine	8 by 10 inches		7 by 10 inches	8 by 8 inches.
18. Boilers:				
(a) Number	1	1	1	1.
(b) Type	Locomotive fire tube	Scotch marine waterback	Firebox	Locomotive.
(c) Dimensions	66 inches diameter, 20 feet long	8 feet 3 inches diameter, 17 feet 5 inches long.	5 feet by 16 feet 10 inches	70 inches diameter, 18 feet 6 inches long.
(d) Number, diameter, and length of tubes in one boiler.	112; 3 inch diameter, 13 feet long.	80 tubes, 3½ inch diameter, 13 feet long.	92; 3 inch diameter, 117 inches long.	130; 3 inch diameter, 12½ feet long.
(e) Heating surface (total)	1,500 square feet	1,100 square feet	1,189 square feet	1,288 square feet.
(f) Grate surface (total)	25 square feet	34 square feet	20 square feet	27½ square feet.
9. Working steam pressure	125 pounds	160 pounds	106 pounds	125 pounds.

ATTENDANT PLANT.				
Towboats.				
20. Name of tug attached to dredge	King and McPherson	U. S. snagboat Flint		McPherson and Colbert.
21. Owner	U. S. Engineer Department	U. S. Engineer Department		U. S. Engineer Department
22. Number of crew	King 8; McPherson, 10; to each shift.	8		10 to each shift.
Launches.				
23. Name		Carp		
24. Number of crew		No regular crew		
Scows.				
25. Number of scows in use	2	1		2.
26. Type	Side dump	Flat wooden		Side dump.
27. Capacity (each)	75 cubic yards	80 tons		150 cubic yards.
28. Identifying letter or number		Barge No. 45		No. 4-R and 9.
WORK PERFORMED.				
29. Location of dredging	Tuscumbia Bar, Johnsonville Landing, and Duck River Sucks.	Flint River, Ga., between Du-Bignon and Bainbridge.		Riverton Lock approach and Buck Island Shoals.
0. Average depth before dredging	3 to 5 feet	2.3 feet		3 and 4 feet.
31. Average depth after dredging	6 feet	6 feet		6 feet.
32. Average width of cut	37½ feet	70 feet		37½, single cut.
33. Total distance cut ahead by dredge, in feet.	17,350 feet	2,200 feet		9,355 feet.
34. Total amount dredged in cubic yards during year:				
(*a*) Rock; (1) unit cost	(*a*) 5,710; (1) $1.36	(*a*) 26,655; (1) $0.297		
(*b*) Sand and mud; (2) unit cost	(*b*) 29,890; (2) $0.26			
35. Average number of cubic yards dredged:				
(*a*) Per day	276	520		
(*b*) Per hour	42	65		
36. Maximum number of cubic yards dredged:				
(*a*) In one day	1,200	1,000		900.
(*b*) In one hour	150	130		80.
37. Average number of hours worked per day.	6	5		8.
38. Total number of days upon which any dredging was done.	129	51		68.
39. Average distance in miles from work to dump.	1			½ to 1 mile.
40. Number of scows loaded during year.	307			302, part casted.
41. Number of scows loaded per day	2			

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Tuscumbia.*		*Upatoi.*		*Vulcan.*		*Wataugа.*	
WORK PERFORMED—continued.								
42. Average time to load one scow	30 minutes to 1½ hours						40 minutes to 6 hours.	
43. Average load in cubic yards per scow								
44. Average time to tow load to dump and return.	30 minutes to 1 hour						45 minutes.	
45. Number of scows per tow	1						1 and 2.	
46. Character of dredged material and average percentage:								
(*a*) Mud								
(*b*) Rock	19 per cent		100 per cent					
(*c*) Sand	81 per cent gravel							
Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
47. Dredging	842		242				542	
48. Handling scows	30						5	
49. Spudding up	73		12				42	
50. Miscellaneous	61						756	
Distribution of time lost in hours.								
51. Repairing:								
(*a*) Hull			9				12	
(*b*) Machinery	78		33				15	
52. Bad weather	884						486	
53. Changing location of plant	112		57				70	
54. Delays	64		5				19	
55. Sundays and holidays	1,472		528				1,472	
56. Out of commission	4,768		7,840				4,824	
57. Miscellaneous	376		34				280	
58. Total number of hours in year	8,760		8,760		8,760		8,760	
COST OF WORK.								
Dredge.								
59. Pay rolls	$4,233.98		$3,970.30				$4,189.21	
60. Coal	1,566.30		561.26				1,117.15	

61. Supplies:												
(a) Subsistence	1,311.77			996.62			....			1,262.83		
(b) Machinery	228.65			183.57			....			107.65		
(c) Miscellaneous	355.82			392.17			....			115.80		
62. Renewals or additions to outfit	165.30			95.00			....			18.80		
63. Ordinary repairs:												
(a) Hull	251.32			133.64			375.00			628.61		
(b) Machinery	1,378.37			199.94			385.70			425.58		
64. Laundry, ice, miscellaneous	119.39			137.06			....			110.80		
65. Total		$9,609.90			$6,669.56			$760.70			$7,946.73	
Tugboats.												
66. Operating cost for year	1,649.22			....			....			606.91		
67. Ordinary repairs	231.15			....			....			458.00		
68. Total		1,880.37			....			....			1,064.91	
Launch.												
69. Operating cost for year	....			....			....			....		
70. Ordinary repairs	....			....			....			15.95		
71. Total		....			....			....			15.95	
Barges and scows.												
72. Ordinary repairs	[1] 240.10			....			....			[1] 96.48		
73. Total		240.10			....			760.70			96.48	
74. Total field cost			$11,730.37			$6,669.56			$760.70			$9,124.07
Gross cost.												
75. Office expenses, superintendence, surveys, etc.			[2] 1,436.52			1,247.21			420.26			[2] 1,100.19
76. Extraordinary repairs to dredge:												
(a) Hull			....			....			....			4,041.20
(b) Machinery			....			....			....			....
77. Extraordinary repairs to towboats and launches.			962.85			....			....			63.64
78. Extraordinary repairs to barges and scows.			1,474.95			....			....			....
79. Grand total			15,604.69			[1] 7,916.77			1,180.96			14,329.10

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Tuscumbia.*	*Upatoi.*	*Vulcan.*	*Watauga.*
Cost per cubic yard.				
80. Field cost per cubic yard:				
(*a*) Mud or sand	$0.16			
(*b*) Rock	$1.02 and $0.47	$0.25		
81. Gross cost per cubic yard:				
(*a*) Mud or sand	$0.22			
(*b*) Rock	$1.36 and $0.63	$0.297		
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons	352	Wood, 279 cords		327.
83. Fuel consumed by auxiliary plant in long tons.				
84. Cost per hour of effective working time.	$15.51	$31.16		$10.65.
85. Cost of fuel per ton	$4.44	$1.75 to $2.25 per cord		$3.42.
86. Number of days in commission	152	72	Not in commission	208.
87. Number of shifts worked per day	2	1		2.
	Remarks. No drill unit used in connection with this dredge. [1] Includes quarterboat and shopboat repairs. [2] Includes field, Nashville, and Cincinnati office expenses.	*Remarks.* The drilling barge No. 46 was used as attendant drill boat for drilling and blasting rock, and its costs are included in the above report.	*Remarks.*	*Remarks.* Drill unit No. 3-S, costs not included in above operations. This dredge also forms part of drill unit No. 2-H and costs given above include proportion of charges for that unit. [1] Includes quarterboat repairs. [2] Includes field office, Nashville, and Cincinnati office expenses.

Name, letter, or number	*No. 1.*		*No. 2.*		*No. 68.*
1. District	Pittsburgh, Pa.		Pittsburgh, Pa.		Little Rock, Ark.
2. Length	85 feet		86 feet 6 inches		104 feet 7 inches.
3. Beam	32 feet		30 feet		30 feet 6 inches.
4. Depth	7 feet		5 feet		5 feet 4 inches.
5. Draft:					
(*a*) Forward	5 feet		3 feet 2 inches		3 feet.
(*b*) Aft	3 feet 3 inches		2 feet 6 inches		2 feet.
6. Displacement	314 tons		197 tons		220 tons.
7. Builder:					
(*a*) Hull and material of hull	United States boat yard, Lock 4, Pa.; wood.		Parkersburg Dock Co.; wood		U. S. Engineers; creosoted pine.
(*b*) Machinery	M. A. Sweeney Shipyard & Foundry Co.		The Bucyrus Co., Milwaukee, Wis		Bucyrus Co.
8. Where built	Lock 4, Pa		Parkersburg, W. Va		Hull at Batesville, Ark.
9. When built	1911-12		1905		Hull, 1912; machinery, 1896; boiler, 1906.
10. Time to build	7 months				3½ months.
11. Contract cost	$15,810.40		$17,000		$12,673.83 (hired labor).
12. Finished cost with outfit (exclusive of of scows, tugs, and launches).			Purchased from Evansville contract		$15,485.55.[1]
13. Bucket:					
(*a*) Type	Dipper		Dipper		Dipper.
(*b*) Capacity	2.3 yards and 3 yards		1.75 and 2.25 yards		1½ cubic yards.
14. Length of boom	40 feet		35 feet		50 feet.
15. Maximum dredging depth	23 feet		20 feet 6 inches		18 feet.
16. Dimensions of main hoisting-engine cylinders.	11 inches diameter, 14-inch stroke		10 inches diameter, 14-inch stroke		9 by 12 inches.
17. Dimensions of swinging engine	8 by 8 inches, 2-cylinder, horizontal		8 by 8 inches		8 by 10 inches.
18. Boilers:					
(*a*) Number	2		2		1.
(*b*) Type	Locomotive.	Vertical.	Locomotive.	Vertical.	6-flue, Mississippi River type.
(*c*) Dimensions	17 feet 4 inches by 60 inches diameter.	7 feet 3 inches by 30 inches diameter.	17 feet 4 inches by 62 inches diameter.	7 feet by 36 inches diameter.	42 inches by 22 feet.
(*d*) Number, diameter, and length of tubes in one boiler.	76; 12 feet by 3 inches diameter.	31; 4 feet 10 inches by 2 inches diameter.	76, 3 inches diameter by 12 feet.	68; 2 inches diameter by 3 feet 2 inches.	Two 12-inch; four 6-inch; 22 feet long.
(*e*) Heating surface (total)	840 square feet	80 square feet	840 square feet	128 square feet	438 square feet.
(*f*) Grate surface (total)	22.5 square feet	3.1 square feet	22.5 square feet	4.9 square feet	18 square feet.
19. Working steam pressure	150 pounds	100 pounds	125 pounds	100 pounds	90 pounds per square inch.
ATTENDANT PLANT.					
Towboats.					
20. Name of tug attached to dredge	Steamer T. P. Roberts		Steamer Swan		A. D. Allen.[2]
21. Owner	United States		United States		U. S. Engineers.
22. Number of crew	10		12		8.

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*No. 1.*	*No. 2.*	*No. 68.*
ATTENDANT PLANT—continued.			
Launches.			
23. Name			
24. Number of crew			
Scows.			
25. Number of scows in use	2	2	2.[3]
26. Type	Side dump, 4 pockets, nonpropelling	Side dump, 4 pocket, nonpropelling	Hopper top: side dump.
27. Capacity (each)	90 cubic yards	90 cubic yards	300 tons.
28. Identifying letter or number	Nos. 5 and 6	Nos. 1 and 2	D. S. 1 and D. S. 2.
WORK PERFORMED.			
29. Location of dredging	Allegheny and upper Ohio Rivers	On Monongahela River	White and Black Rivers, Ark.
30. Average depth before dredging	4 to 8 feet	4 to 8 feet	3½ feet.
31. Average depth after dredging	8 to 12 feet	8 to 12 feet	6½ feet.
32. Average width of cut			38 feet.
33. Total distance cut ahead by dredge, in feet.			11,557.
34. Total amount dredged in cubic yards during year:			
(*a*) Rock; (1) unit cost	(*a*) 21,377	(*a*) 5,714	(*a*) None.
(*b*) Sand and mud; (2) unit cost	(*b*) 88,225	(*b*) 72,770	(*b*) 44,272;[4] (2) $0.081.
35. Average number of cubic yards dredged:			
(*a*) Per day	1,107	430	409.5.
(*b*) Per hour	138	55	51.2.
36. Maximum number of cubic yards dredged:			
(*a*) In one day	1,260	1,080	600.
(*b*) In one hour	155	132	75.
37. Average number of hours worked per day.	8	8	8.
38. Total number of days upon which any dredging was done.	90	179	107.
39. Average distance in miles from work to dump.	1-2½		Alongside except when backfilling dams.
40. Number of scows loaded during year	942	629	63.[5]
41. Number of scows loaded per day	1-16	2-12	1 to 6.[5]
42. Average time to load one scow			1 hour.[5]
43. Average load in cubic yards per scow	90	90	60.
44. Average time to tow load to dump and return.			1 hour.

45. Number of scows per tow	1		1		1.	
46. Character of dredged material and average percentage:						
(a) Mud					20 per cent.	
(b) Rock	20		7		59 per cent (gravel).	
(c) Sand	80 (and gravel)		93 (and gravel)		21 per cent.	
Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
47. Dredging	794	....	1,429	....	633	....
48. Handling scows	....	....	....	....	38	30
49. Spudding up	....	....	....	....	169	50
50. Miscellaneous	1,223	....	341	....	....	....
Distribution of time lost in hours.						
51. Repairing:						
(a) Hull	....	....	....	....	....	....
(b) Machinery	86	....	242	....	130	30
52. Bad weather	326	....	454	....	55	....
53. Changing location of plant	45	....	74	....	200	10
54. Delays	36	....	170	....	35	....
55. Sundays and holidays	448	....	396	....	232	....
56. Out of commission	5,802	....	5,654	....	4,418	....
57. Miscellaneous	....	....	....	....	2,848	....
58. Total number of hours in year	8,760	....	8,760	....	8,760	....
COST OF WORK.						
Dredge.						
59. Pay rolls	$8,178.09		$7,893.08		$1,993.00	
60. Coal	1,212.90		1,445.64		705.60	
61. Supplies:						
(a) Subsistence	2,176.38		1,761.61		414.46	
(b) Machinery	232.07		368.44		88.51	
(c) Miscellaneous	334.89		381.72		....	
62. Renewals or additions to outfit	1,218.82		536.01		....	
63. Ordinary repairs:						
(a) Hull	385.01		53.96		....	
(b) Machinery	535.55		262.06		....	
64. Laundry, ice, miscellaneous	377.91		261.97		85.02	
65. Total		$14,651.62		$12,964.49		$3,286.59

TABLE 6.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*No. 1.*			*No. 2.*			*No. 68.*		
COST OF WORK—continued.									
Towboats.									
66. Operating cost for year	[1] 11,034.97			[1] 11,675.81			[5] 216.85		
67. Ordinary repairs	72.19			180.36			....		
Total		11,107.16			11,856.17			216.85	
Launch.									
69. Operating cost for year	....			....			....		
70. Ordinary repairs	....			....			....		
71. Total		....			....			....	
Barges and scows.									
72. Ordinary repairs	136.66			67.40			107.19		
73. Total		136.66			67.40			107.19	
74. Total field cost			$25,895.44			$24,888.06			$3,610.63
Gross cost.									
75. Office expenses, superintendence, surveys, etc.			....			....			318.43
76. Extraordinary repairs to dredge:									
(a) Hull			....			....			348.90
(b) Machinery			....			....			1,054.87
77. Extraordinary repairs to towboats and launches.			....			....			....
78. Extraordinary repairs to barges and scows.			....			....			....
79. Grand total			25,895.44			24,888.06			5,332.83
Cost per cubic yard.									
80. Field cost per cubic yard:									
(a) Mud or sand	24 cents			31 cents			3.1 cents per cubic yard.		
(b) Rock	23½ cents			32 cents			None.		
81. Gross cost per cubic yard:									
(a) Mud or sand	....			....			12 cents per cubic yard		
(b) Rock	....			....			None		

MISCELLANEOUS.			
82. Fuel consumed by dregde in long tons.	606	416	152.7.
83. Fuel consumed by auxiliary plant in long tons.	600	524	34.7.
84. Cost per hour of effective working time.	$1.28	$1.45	$6.51 gross; $4.68 field.
85. Cost of fuel per ton	$2 to $3.15	$1.90 to $5	$4.20.
86. Number of days in commission	365	335	178.
87. Number of shifts worked per day	1	1	1.
	Remarks.	*Remarks.*	*Remarks.*
	Dredging above, at, and below dams Nos. 6, 7, and 10, Ohio River, and at No. 1, Allegheny River; helping in the repair of lockgate tracks and pumping of coffer at No. 1; helping in the repair of two bear traps at No. 6, Ohio River, and other miscellaneous work. While out of commission considerable repair work was done by the dredge crew. [1] Towboat not regularly attached to dredge.	*Work done.*—Excavating for foundation of guide and apron cribs, helping in temporary and permanent repairs in break of dam, and dredging coffer of lock chamber at Lock 4; building coffer for water turbine house at Lock 3; loading stone and removing and leveling foundations of old cribs at Lock 2, and doing other miscellaneous work. Laid up for repairs and crew helping in repair work at boatyard, Lock 4. [1] Snagboat not regularly attached to dredge.	No drill boats. [1] Rebuilt value including worth of old machinery and upper works transferred from old hull to new hull. [2] Not regularly attached; used only for moving dredge, for changing location of dredge and for towing dump scows when back filling dams. [3] Used only when back filling dams. [4] 25,740 cubic yards gravel, 9,335 cubic yards sand, and 9,197 cubic yards mud. [5] While with dredge only.

TABLE 7.

BUCKET DREDGES.

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917.*

Name, letter, or number	*Ajax.*	*Alabama.*	*Albany.*[1]	*8-8*
1. District	Wilmington, N. C.	Chattanooga, Tenn.	Montgomery, Ala.	Fourth, Mississippi River.
2. Length	82 feet.	80 feet.	70 feet.	110 feet.
3. Beam	32 feet 8 inches	37 feet 8 inches	30 feet.	40 feet.
4. Depth	10 feet 4 inches	6 feet 4 inches	4 feet 9 inches	7 feet 3 inches.
5. Draft:				
(a) Forward	5 feet 8 inches	3 feet 6 inches	5 feet 8 inches	3 feet.
(b) Aft	5 feet 2 inches	do	5 feet 2 inches	Do.
6. Displacement	400 tons	244 long tons	75 tons	341 tons.
7. Builder:				
(a) Hull and material of null	Sea Island Chemical Co.; wood	Bucyrus Co.; wood	U. S. Engineer Department; wood.	U. S. Engineers, wood.
(b) Machinery	Capeland & Bacon and Theo. Smith & Sons Co.	Bucyrus Co	Contractors Plant Manufacturing Co.	McMyler Co., Cleveland, Ohio.
8. Where built	Port Royal, S. C	Hull, Chattanooga, Tenn.; machinery, Bucyrus, Ohio.	Columbus, Ga.	New Orleans, La.
9. When built	1884	1891; rebuilt 1903 and 1913	1908	1913–14.
10. Time to build		1 year	4 months	4 months.
11. Contract cost		$22,300	Built by hired labor	
12. Finished cost with outfit (exclusive of barges, tugs, and launches).		$22,500	$18,583.68	$40,680.
13. Where purchased	Charleston, S. C	Chattanooga, Tenn		
14. When purchased	1897	1891		
15. From whom purchased	Cords & Bochman	The Bucyrus Co		
16. Purchase price	$16,050, including outfit	$22,300		
17. Bucket:				
(a) Type	Clamshell	Chain of 24 buckets and links	Orange peel	1 clamshell, 1 drag line, 1 orange peel.
(b) Capacity	5 cubic yards	5 cubic feet to each bucket	1 cubic yard	3 cubic yards and 1¼ cubic yards.
18. Length of boom and material	48 feet; wood	None	60 feet; wood	124 feet; steel.
19. Maximum dredging depth	35 feet with present chains	10 feet	15 feet	50 feet or more.
20. Dimensions of main hoisting-engine cylinders.	Two; 18-inches in diameter, 24-inch stroke.	10 by 14 inches	8¼ by 10 inches	12 by 16 inches.
21. Dimensions of swinging engine		8 by 8 inches		Do.
22. Boilers:				
(a) Number	1	1	1	1.
(b) Type	Locomotive	Marine	Upright	Vertical, tubular.
(c) Dimensions	Length, 18 feet 11½ inches; width, fire box, 6 feet 10⅝ inches inside.	60 inches in diameter, 17 feet long.	50 inches in diameter, 10 feet long.	6 feet 2 inches by 14 feet.
(d) Number, diameter, and length of tubes in one boiler.	114 3-inch tubes, 13 feet 6 inches long.	63; 3 inches in diameter, 6 feet 4½ inches long.	136; 1½ inches in diameter, 6 feet long.	236; 2½ inches in diameter; 9 feet 9 inches long.
(e) Heating surface (total)	1,441 square feet	480 square feet	432.39 square feet	1,373½ square feet.
(f) Grate surface (total)	27.5 square feet	16 square feet	9.62 square feet	20.20 square feet.
(g) Working steam pressure	95 pounds allowed	90 pounds	100 pounds	100 pounds.

ATTENDANT PLANT.				
Towboat.				
23. Name of tug attached to dredge	Coquet			
24. Owner	U. S. Engineer Department			
25. Number of crew	8			
Launches.				
26. Name	Polly			
27. Number of crewa	Operated by dredge crew			
Scows.				
28. Number of scows in use	2			
29. Type	Bottom dump			
30. Capacity (each)	300 cubic yards			
31. Identifying letters or numbers	E and D			
WORK PERFORMED.				
32. Location of dredging	Cape Fear River above Wilmington.	Muscle Shoals Canal	No work performed	Various levees.
33. Average depth before dredging	5.1	4 feet		
34. Average depth after dredging	9			
35. Average width of cut	50	75 and 80		
36. Total distance cut ahead by dredge in feet.	2,725	10,004		
37. Total amount dredged in cubic yards during year:				
(a) Rock; (1) unit cost	(1)			
(b) Sand and mud; (2) unit cost	(b) 53,708.5; (2) see 78[2]	(b) 56,729; (2) $0.0567		(b) 462,172
38. Average number of cubic yards dredged:				
(a) Per day	565.3	746		2,160.
(b) Per hour	75.6	100		102.
39. Maximum number of cubic yards dredged:				
(a) In one day	1,359	1,333		3,700.
(b) In one hour	136	166		180.
40. Average number of hours worked per day.	11⅓			21.1
41. Total number of days upon which any dredging was done.	95	76		214.
42. Average distance in miles from work to dump.	1			
43. Number of scows loaded during year	91⅔			
44. Number of scows loaded per day	2			
45. Average time to load one scow	5 hours, 40 minutes.			
46. Average load in cubic yards per scow	301.2			

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Ajax.*		*Alabama.*		*Albany.*		*S-2*	
WORK PERFORMED—continued.								
46½. Average time to tow load to dump and return.	Approximately 2 hours							
47. Number of scows per tow	1							
48. Character of dredged material and average percentage:								
(*a*) Mud	35 per cent		100 mud and sand					
(*b*) Rock	(1)							
(*c*) Sand	65 per cent							
Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
49. Dredging	709	45	568				4,528	
50. Waiting on tug	155							
51. Spudding up	71							
52. Miscellaneous	137	15						
Distribution of time lost in hours.								
53. Repairing:								
(*a*) Hull	212							
(*b*) Machinery, and cleaning boiler	133		207				1,029	
54. Bad weather	195	30					105	
55. Changing location of plant	55	30	33				350	
56. Delays	93						314	
57. Sundays and holidays	408		1,502				1,282	
58. Out of commission, nights	6,350		4,096		8,760		25	
59. Miscellaneous	[3] 240		1,554				1,127	
60. Total number of hours in year	8,760		8,760		8,760		8,760	
COST OF WORK.								
Dredge.								
61. Pay rolls	$3,856.35		$2,303.73				$18,909.85	
62. Coal	1,219.60		283.15				4,659.00	

63. Supplies:												
(a) Subsistence	929.43			...			...			4,342.10		
(b) Machinery	32.01			10.35			...			...		
(c) Miscellaneous	153.09			53.04			...			4,946.97		
64. Renewals or additions to outfit, property, and rope.	462.15			...			...			1,284.18		
65. Ordinary repairs:												
(a) Hull	46.99			...			...			...		
(b) Machinery	131.61			333.04			...			1,274.61		
66. Laundry, ice, miscellaneous	1,374.97			...			...			3,185.68		
67. Total	...	$8,206.20			$2,963.31			...			$38,692.39	
Towboat.												
68. Operating cost for year	$5,879.89			...			...			...		
69. Ordinary repairs	119.15			...			...			...		
Total		5,999.04			...			...			...	
Barges and scows.												
70. Ordinary repairs	22.11			...			...			...		
71. Total		22.11			...			...			...	
72. Total field cost			$14,227.35			$234.02			...			$38,692.39
Gross cost.												
73. Office expenses, superintendence, surveys, etc.			75.00			...			...			1,274.11
74. Extraordinary repairs to dredge:												
(a) Hull			...			...			...			...
(b) Machinery			...			...			...			...
75. Extraordinary repairs to towboats and launches.			...			...			...			...
76. Extraordinary repairs to barges and scows.			...			...			...			...
77. Grand total			14,302.35			3,217.33			...			39,966.50
Cost per cubic yard.												
78. Field cost per cubic yard:												
(a) Mud or sand	$0.14			$0.0526			...			$0.0837.		
(b) Rock	...			...			...					
79. Gross cost per cubic yard:												
(a) Mud or sand	...			$0.0567			...			$0.0864.		
(b) Rock	...			...			...					

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Ajax.*	*Alabama.*	*Albany.*[1]	*8-2*
Miscellaneous.				
80. Fuel consumed by dredge in long tons.	182	89.8		770.
81. Fuel consumed by auxiliary plant in long tons.	143			
82. Cost per hour of effective working time.	$13.27	$5.664		$8.83.
83. Cost of fuel per ton	$6.72	$3.34		$6.05.
84. Number of days in commission	183	85		365.
85. Number of shifts worked per day	1	1		3.
	Remarks. No drill boat operated. This dredge was used to assist in construction of locks at Browns Landing. [1] Dredging out old bridge pier. [2] Part was back filling without scow (26,000 yards). [3] Handling rock, 118 hours. [4] Of this amount $7,499.99 is a proper charge against dredging, and is used as a basis for computing unit cost.	*Remarks.* Was operated in connection with work at Muscle Shoals Canal. [1] No work necessary.	*Remarks.* Just prior to Jan. 1, 1917, the Albany was tied up and was not operated at all during the year. This plant was dismantled in December, 1917, under authority from the Chief of Engineers, dated Dec. 20, 1917.	*Remarks.* The dredge is a levee building machine and is used for that purpose entirely.

Name, letter, or number	*Malta.*	*Manito.*	*Mason.*	*Monticello.* (Also reported in Table V.)
1. District	Second, Cincinnati	St. Paul, Minn	Wheeling, W. Va	Second, Portland, Oreg.
2. Length	70 feet	106 feet	100 feet	103 feet 3 inches.
3. Beam	31 feet 4 inches	44 feet	27 feet	34 feet 6 inches.
4. Depth	6 feet 10 inches	7 feet	5 feet 6 inches	5 feet 10 inches.
5. Draft:				
(*a*) Forward	3 feet 6 inches	2 feet 7 inches	2 feet 6 inches	2 feet 3 inches.
(*b*) Aft	3 feet	2 feet 5 inches	3 feet 6 inches	2 feet 1 inch.
6. Displacement	160 tons	307 long tons	300 tons	195 tons.
7. Builder:				
(*a*) Hull and material of hull	Bucyrus Co.; wood	United States; wood	United States; wood	St. Helens Shipbuilding Co.; wood.
(*b*) Machinery	do	American Hoist & Derrick Co.	Furnished by various firms	Willamette Iron & Steel Works.
8. Where built	Muskingum River and Bucyrus, Ohio.	Cohasset, Minn. (hull); St. Paul, Minn. (machinery).	Dams Nos. 21 and 28, Ohio River.	Hull and house, St. Helens, Oreg.; machinery, Portland, Oreg.
9. When built	1887–88	1914–15	1915	1915.
10. Time to build	7 months	6 months	4 months	140 calendar days.
11. Contract cost	$13,000			$27,830.
12. Finished cost with outfit (exclusive of barges, tugs, and launches).	$17,000	$41,000	$17,169.07	$29,245.33.
13. Where purchased				
14. When purchased				
15. From whom purchased				
16. Purchase price				
17. Bucket:				
(*a*) Type	Endless chain on ladder	4-leafed orange peel	23 digging buckets	Clamshell.
(*b*) Capacity	24; 3 cubic feet each	3 cubic yards	5¼ cubic feet each	1½ cubic yards.
18. Length of boom and material		100 feet (steel)	Two, 55 feet 6 inches each	70 feet; wood.
19. Maximum dredging depth	10 feet	20 feet with present lines	28 feet	16 feet.
20. Dimensions of main hoisting-engine cylinders.	2; each 10 inches diameter, 16-inch stroke.	2, each 12 by 16 inches	Single cylinder 10½ by 36 inches.	10 by 13 inches.
21. Dimensions of swinging engine		2, each 9 by 10 inches		Main engine is used.
22. Boilers:				
(*a*) Number	1	1	1	1.
(*b*) Type	Locomotive	Scotch marine, wet back	Return tubular	Scotch marine.
(*c*) Dimensions	17 feet 4 inches by 4 feet	8 feet 6 inches by 13 feet 6 inches.	6 feet diameter, 13 feet long	Length, 11 feet; diameter, 7 feet 6 inches.
(*d*) Number, diameter, and length of tubes in one boiler.	60; 3 inches diameter, 10 feet long.	138 tubes, each 3 inches by 11 feet.	82; 3 by 138 inches; 46.4 by 74 inches.	98 of 3 inches by 8 feet 6 inches.
(*e*) Heating surface (total)	675 square feet	1,565 square feet	1,140 square feet	772 square feet.
(*f*) Grate surface (total)	18 square feet	38 square feet	27½ square feet	1 oil burner; 1 furnace of 42 inches.
(*g*) Working steam pressure	90 pounds	125 pounds	125 pounds	100 pounds.

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Malta.*		*Manito.*	*Mason.*	*Monticello.* (Also reported in Table V.)
ATTENDANT PLANT.	Merrill.	Grace V.			
Towboat.					
23. Name of tug attached to dredge			Animiki	Crozet	Woodland.
24. Owner	United States	R. H. Valentine	United States	United States	United States.
25. Number of crew	7	2	3	7	4.
Launches.					
26. Name			Nodin	Alto	
27. Number of crew			1	3	
Scows.					
28. Number of scows in use	2		6	Various flats and barges used indiscriminately.	
29. Type	Center dumping		2 coal flats, 2 tank scows, 2 quarter boats.		
30. Capacity (each)	92 cubic yards		Coal, 50 tons each; tanks, 15 and 35; quarter boats, 25 tons.		
31. Identifying letters or numbers	Nos. 59 and 60		Amik, Niggik, Tigo, Nawapon, Wigwam, Wampum.		
WORK PERFORMED.					
32. Location of dredging	Muskingum River		Mississippi and Leech Rivers, Minn.	Within ½ mile of Dam No. 21, Ohio River.	Columbia River, below mouth of Willamette River, Oreg.; Cowlitz and Lewis Rivers, Wash.; Clatskanie River, Oreg.
33. Average depth before dredging	2 feet 4 inches		3.5 feet	4 feet	1 foot 6 inches.
34. Average depth after dredging	6 feet 11 inches		8 feet	25 feet or less	4 feet.
35. Average width of cut	55.4 feet		125 feet on Mississippi; 100 feet on Leech.	8 feet at the bottom	60 feet.
36. Total distance cut ahead by dredge in feet.	10,721		6,900 feet	Not used in continuous cut	11,780.
37. Total amount dredged in cubic yards during year:					
(a) Rock; (1) unit cost	(a) 113; (1) $1				
(b) Sand and mud; (2) unit cost	(b) 71,442; (2) $0.1705		(b) 231,529 cubic yards	(b) 30,000 cubic yards; (2) 28.8 cents (sand and gravel).	(b) 98,718; (2) $0.14.
38. Average number of cubic yards dredged:					
(a) Per day	650		2,362	205	620.87.
(b) Per hour	115		147.6	20	136.84.

39. Maximum number of cubic yards dredged:				
(a) In one day	1,196	3,600	575	1,073.
(b) In one hour	184	225	70	150.
40. Average number of hours worked per day.	8	16	6	8.05.
41. Total number of days upon which any dredging was done.	110	98	128	159.
42. Average distance in miles from work to dump.	0.37	Dump on bank alongside dredge.	¼ mile	Material deposited on bank where practicable.
43. Number of scows loaded during year	689		400	
44. Number of scows loaded per day	6		3	
45. Average time to load one scow	40 minutes		3 hours	
46. Average load in cubic yards per scow	90.5		75	
46½. Average time to tow load to dump and return.	15 minutes		About 2 hours	
47. Number of scows per tow	1		2	
48. Character of dredged material and average percentage:				
(a) Mud	87.516	25 per cent		
(b) Rock	0.158		60 per cent (gravel)	
(c) Sand	12.326	75 per cent	40 per cent	100.

Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
49. Dredging	621	20	1,540		1,506		721	10
50. Waiting on tug	90	10			20			
51. Spudding up	62	50			21		67	22
52. Miscellaneous	195	55					347	45
Distribution of time lost in hours.								
53. Repairing:								
(a) Hull	59	30	2		95		32	8
(b) Machinery, and cleaning boiler	273	25	346		108		26	15
54. Bad weather	2,258						48	
55. Changing location of plant	171	50	88				31	25
56. Delays	3						5	55
57. Sundays and holidays	1,022		400		816		840	
58. Out of commission, nights	3,696		[1] 6,240		2,920		6,640	
59. Miscellaneous	306		144		3,274			
60. Total number of hours in year.	8,760		8,760		8,760		8,760	

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Malta.*			*Manito.*			*Mason.*			*Monticello.* (Also reported in Table V.)		
COST OF WORK.												
Dredge.												
61. Pay rolls	$4,339.72			$4,585.91			$2,425.02			$5,841.63		
62. Coal	523.23			2,619.47			1,417.00			1,009.88		
63. Supplies:												
(a) Subsistence	....			1,144.28			....			1,294.58		
(b) Machinery	64.30			256.25			14.26			220.55		
(c) Miscellaneous	58.18			331.47			340.09			174.91		
64. Renewals or additions to outfit, property, and rope.	60.04			825.50			....			549.57		
65. Ordinary repairs:												
(a) Hull	296.21			13.40			321.30			106.85		
(b) Machinery	1,193.78			1,751.13			2,058.95			....		
66. Laundry, ice, miscellaneous	65.40			....			29.66			98.67		
67. Total		$6,600.86			$11,527.36			$6,606.28			$9,291.64	
Towboat.												
68. Operating cost for year	5,322.84			[2] 1,446.32			(1)			3,957.57		
69. Ordinary repairs	302.54			[2] 147.79			(1)			8.55		
Total		5,625.38			[2] 1,594.11			....			3,966.12	
Barges and scows.												
70. Ordinary repairs	67.29			310.69			2,051.54			....		
71. Total		67.29			310.69			2,051.54			....	
72. Total field cost			$12,293.53			$13,432.16			$8,657.82			$13,267.76
Gross cost.												
73. Office expenses, superintendence, surveys, etc.			....			10,094.18			....			559.00
74. Extraordinary repairs to dredge:												
(a) Hull			....			....			....			....
(b) Machinery			....			2,799.24			....			....
75. Extraordinary repairs to towboats and launches.									(1)			....
76. Extraordinary repairs to barges and scows.			....			....			....			....
77. Grand total			12,293.53			[illegible]			8,657.82			[illegible]

Cost per cubic yard.				
d cost per cubic yard:				
(a) Mud or sand	$0.1705	5.80 cents	28.8 cents (sand and gravel)	$0.1344.
(b) Rock	$1			
79. Gross cost per cubic yard:				
(a) Mud or sand	$0.1705	11.37 cents	28.8 cents (sand and gravel)	$0.140.
(b) Rock	$1			
Miscellaneous.				
80. Fuel consumed by dredge in long tons.	167.09	264.5	342	108.27.[1]
81. Fuel consumed by auxiliary plant in long tons.	221.82			97.88.[1]
82. Cost per hour of effective working time	$12.67	$17.09	$5.75	$12.167.
83. Cost of fuel per ton	$3.13	$8.85	$3.70	$9.309.[1]
84. Number of days in commission	257	135	146	237.
85. Number of shifts worked per day		2		
		Remarks. [1] Includes winter. [2] Includes launch.	*Remarks.* No attendant drill boats were used. [1] See report for Crozet.	*Remarks.* No drill boats in attendance. [1] Fuel oil.

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Cascade.*	*Casey.*	*Grossetete.*	*Hercules.*
1. District	First, Portland, Oreg	Louisville, Ky	New Orleans, La	Wilmington, N. C.
2. Length	70 feet	86 feet	80 feet 4 inches	100 feet.
3. Beam	30 feet	28 feet	34 feet 2½ inches	38 feet.
4. Depth	4 feet	6 feet 5 inches	5 feet	11 feet 4 inches.
5. Draft:				
(a) Forward	18 inches	2 feet 6 inches	3 feet	5 feet.
(b) Aft	do	do	do	7 feet.
6. Displacement	90 tons	163.4 long tons	258 tons	670 tons.
7. Builder:				
(a) Hull and material of hull	U. S. Engineers; wood	United States; wood	U. S. Engineer Department; barge hull of wood.	Theo. Smith & Sons Co.; wood.
(b) Machinery	Lidgerwood Manufacturing Co	J. S. Mundy & Co., and Lambert Engineering Co.	Clyde Engine and Pennsylvania Boiler Works, boiler.	Theo. Smith & Sons Co.
8. Where built	Portland, Oreg	Louisville, Ky	New Orleans, La	Jersey City, N. J.
9. When built	1906; new hull, 1915	1907	1913	1907.
10. Time to build	3 months	3 months	5 months	About 6 months.
11. Contract cost		$15,132.13	$15,087.63	$61,350.
12. Finished cost with outfit (exclusive of barges, tugs, and launches).	$6,056		$16,951.07	$64,546.04.
13. Where purchased				Jersey City, N. J.
14. When purchased				1907.
15. From whom purchased				Theo. Smith & Sons Co.
16. Purchase price				$61,350.
17. Bucket:				
(a) Type	Hayward	Clamshell and orange-peel	Hayward orange peel	Clamshell.
(b) Capacity	1 cubic yard	2 cubic yards and 1½ cubic yards.	1½ cubic yards	7 cubic yards.
18. Length of boom and material	52 feet, wood	50 and 34 feet; steel (2 booms)	75 feet; wood	59 feet; wood.
19. Maximum dredging depth	14 feet	30 feet	10 feet	About 35 feet.
20. Dimensions of main hoisting-engine cylinders.	10-inch diameter by 12-inch stroke.	Double cylinder 11 by 18 inches.	10 by 12 inches	18-inch diameter, 24-inch stroke.
21. Dimensions of swinging engine		6½ by 8 inches		
22. Boilers:				
(a) Number	1	1	1	1.
(b) Type	Vertical	Locomotive	Locomotive	Locomotive.
(c) Dimensions	48 inches diameter; 108 inches height.	4½ by 19½ feet	19 feet long by 5 feet diameter	22 feet 10½ inches long; width of fire box, 7 feet.
(d) Number, diameter, and length of tubes in one boiler.	146; 2 inches; 6 feet	76; 3 inches; 13 feet 1 inch	88; 3 inches; 14 feet long	140; 3 inches; 14 feet.
(e) Heating surface (total)	364 square feet	803 square feet	1,094 square feet	1,710 square feet.
(f) Grate surface (total)	10 square feet	20 square feet	22 square feet	30.25 square feet.
(g) Working steam pressure	120 pounds	110 pounds	100 pounds	100 pounds allowed, 80 pounds used.

ATTENDANT PLANT.					
Towboat.					
23. Name of tug attached to dredge	Lydia Anne.	George W. Simmons.	Cherokee		Cynthia.
24. Owner	Tracy D. Cartland.	J. H. Dunlop	United States		U. S. Engineer Department.
25. Number of crew	2	2	9		8.
Launches.					
26. Name	None		None	Calcasieu & Vermilion	
27. Number of crew				1	
Scows.					
28. Number of scows in use	2		6	1	2.
29. Type	Bottom dump		Bottom dump	Open barge (fuel)	Dump scows.
30. Capacity (each)	188.6 cubic yards		100 and 150 cubic yards	70 tons	(E) 300, (G) 500 cubic yards.
31. Identifying letters or numbers	Nos. 1 and 2		Nos. 17, 18, 19, 20, 21, and 22	No. 2	E. & G.
WORK PERFORMED.					
32. Location of dredging	Entrance to Cascade Locks		Louisville and Portland Canal	Flat Lake, Bay Natchez and Bayou Grossetete.	Cape Fear River, N. C.
33. Average depth before dredging	5.4 feet		8 feet 3 inches	5.2 feet	22 feet.
34. Average depth after dredging	Not completed		12 feet 5 inches	9 feet	27 feet.
35. Average width of cut	60 feet		29 feet 8 inches	37 feet	40 feet.
36. Total distance cut ahead by dredge in feet.	4,772		25,715	36,298	8,317 feet.
37. Total amount dredged in cubic yards during year:					
(a) Rock; (1) unit cost			(a) 7,736 (1) $0.082		(a) 128; (1) see 78 and 79.
(b) Sand and mud; (2) unit cost	(b) 44,886; (2) $0.144		(b) 108,430 (2)	(b) 112,813.8; (2) $0.112	(b) 99,211; (2) see 78 and 79.
38. Average number of cubic yards dredged:					
(a) Per day	444.4		496.43	386	1,290.
(b) Per hour	55.5		70.66	87	177.4.
39. Maximum number of cubic yards dredged:					
(a) In one day	660.10		2,675 (two shifts)	750	3,335.
(b) In one hour	102.87		440	200	290.
40. Average number of hours worked per day.	8		8	7 hours 10 minutes	8 hours 36 minutes.
41. Total number of days upon which any dredging was done.	101		234	292	77.
42. Average distance in miles from work dump.	½		1.6		2.

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Cascade.*	*Casey.*	*Grossetete.*	*Hercules.*
1. District	First, Portland, Oreg.	Louisville, Ky.	New Orleans, La.	Wilmington, N. C.
2. Length	70 feet	86 feet	80 feet 4 inches	100 feet.
3. Beam	30 feet	28 feet	34 feet 2½ inches	38 feet.
4. Depth	4 feet	6 feet 5 inches	5 feet	11 feet 4 inches.
5. Draft:				
(a) Forward	18 inches	2 feet 6 inches	3 feet	5 feet.
(b) Aft	do	do	do	7 feet.
6. Displacement	90 tons	163.4 long tons	258 tons	670 tons.
7. Builder:				
(a) Hull and material of hull	U. S. Engineers; wood	United States; wood	U. S. Engineer Department; barge hull of wood.	Theo. Smith & Sons Co.; wood.
(b) Machinery	Lidgerwood Manufacturing Co.	J. S. Mundy & Co., and Lambert Engineering Co.	Clyde Engine and Pennsylvania Boiler Works, boiler.	Theo. Smith & Sons Co.
8. Where built	Portland, Oreg.	Louisville, Ky.	New Orleans, La.	Jersey City, N. J.
9. When built	1906; new hull, 1915	1907	1913	1907.
10. Time to build	3 months	3 months	5 months	About 6 months.
11. Contract cost		$15,132.13	$15,087.63	$61,350.
12. Finished cost with outfit (exclusive of barges, tugs, and launches).	$6,056		$16,951.07	$64,546.04.
13. Where purchased				Jersey City, N. J.
14. When purchased				1907.
15. From whom purchased				Theo. Smith & Sons Co.
16. Purchase price				$61,350.
17. Bucket:				
(a) Type	Hayward	Clamshell and orange-peel	Hayward orange peel	Clamshell.
(b) Capacity	1 cubic yard	2 cubic yards and 1½ cubic yards	1½ cubic yards	7 cubic yards.
18. Length of boom and material	52 feet, wood	50 and 34 feet; steel (2 booms)	75 feet; wood	59 feet; wood.
19. Maximum dredging depth	14 feet	30 feet	10 feet	About 35 feet.
20. Dimensions of main hoisting-engine cylinders.	10-inch diameter by 12-inch stroke.	Double cylinder 11 by 18 inches.	10 by 12 inches	18-inch diameter, 24-inch stroke.
21. Dimensions of swinging engine		6½ by 8 inches		
22. Boilers:				
(a) Number	1	1	1	1.
(b) Type	Vertical	Locomotive	Locomotive	Locomotive.
(c) Dimensions	48 inches diameter; 108 inches height.	4½ by 19½ feet	19 feet long by 5 feet diameter	22 feet 10½ inches long; width of fire box, 7 feet.
(d) Number, diameter, and length of tubes in one boiler.	146; 2 inches; 6 feet	76; 3 inches; 13 feet 1 inch	88; 3 inches; 14 feet long	140; 3 inches; 14 feet.
(e) Heating surface (total)	364 square feet	803 square feet	1,094 square feet	1,710 square feet.
(f) Grate surface (total)	10 square feet	20 square feet	22 square feet	30.25 square feet.
(g) Working steam pressure	120 pounds	110 pounds	100 pounds	100 pounds allowed, 80 pounds used.

ATTENDANT PLANT.					
Towboat.					
23. Name of tug attached to dredge	Lydia Anne.	George W. Simmons.	Cherokee		Cynthia.
24. Owner	Tracy D. Cartland.	J. H. Dunlop	United States		U. S. Engineer Department.
25. Number of crew	2	2	9		8.
Launches.					
26. Name	None		None	Calcasieu & Vermilion	
27. Number of crew				1	
Scows.					
28. Number of scows in use	2		6	1	2.
29. Type	Bottom dump		Bottom dump	Open barge (fuel)	Dump scows.
30. Capacity (each)	188.6 cubic yards		100 and 150 cubic yards	70 tons	(E) 300, (G) 500 cubic yards.
31. Identifying letters or numbers	Nos. 1 and 2		Nos. 17, 18, 19, 20, 21, and 22	No. 2	E. & G.
WORK PERFORMED.					
32. Location of dredging	Entrance to Cascade Locks		Louisville and Portland Canal	Flat Lake, Bay Natchez and Bayou Grossetete.	Cape Fear River, N. C.
33. Average depth before dredging	5.4 feet		8 feet 3 inches	5.2 feet	22 feet.
34. Average depth after dredging	Not completed		12 feet 5 inches	9 feet	27 feet.
35. Average width of cut	60 feet		29 feet 8 inches	37 feet	40 feet.
36. Total distance cut ahead by dredge in feet.	4,772		25,715	36,298	8,317 feet.
37. Total amount dredged in cubic yards during year:					
(*a*) Rock; (1) unit cost			(*a*) 7,736 (1)} $0.082		(*a*) 128; (1) see 78 and 79.
(*b*) Sand and mud; (2) unit cost	(*b*) 44,886; (2) $0.144		(*b*) 106,430 (2)}	(*b*) 112,813.8; (2) $0.112	(*b*) 99,211; (2) see 78 and 79.
38. Average number of cubic yards dredged:					
(*a*) Per day	444.4		496.43	386	1,290.
(*b*) Per hour	55.5		70.66	87	177.4.
39. Maximum number of cubic yards dredged:					
(*a*) In one day	660.10		2,675 (two shifts)	750	3,335.
(*b*) In one hour	102.87		440	200	290.
40. Average number of hours worked per day.	8		8	7 hours 10 minutes	8 hours 36 minutes.
41. Total number of days upon which any dredging was done.	101		234	292	77.
42. Average distance in miles from work dump.	⅓		1.6		2.

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Cascade.*		*Casey.*		*Grossetete.*		*Hercules.*	
WORK PERFORMED—continued.								
43. Number of scows loaded during year	476		879		No scows used; dumping on sides of channel.		253.	
44. Number of scows loaded per day	5		3.75				3.28.	
45. Average time to load one scow	2 hours		1 hour, 54 minutes				2 hours 13 minutes.	
46. Average load in cubic yards per scow	92		132.15				393.	
46½. Average time to tow load to dump and return.	50 minutes		1 hour, 18 minutes				2½ hours.	
47. Number of scows per tow	1		1 to 4				1.	
48. Character of dredged material and average percentage:								
(*a*) Mud	50		93.33		100		0.899.	
(*b*) Rock			6.67				0.0013.	
(*c*) Sand	50						0.0997.	
Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
49. Dredging	637	42	1,643	40	1,294	30	560	
50. Waiting on tug			1	30	705		25	
51. Spudding up	41	36	93	20			5	30
52. Miscellaneous	13	5	376	30	166		71	
Distribution of time lost in hours.								
53. Repairing:								
(*a*) Hull			84		417		61	
(*b*) Machinery, and cleaning boiler.	38	15	336	30	390	30	183	30
54. Bad weather					25	30	167	15
55. Changing location of plant	21	57	136	15	109		39	
56. Delays	32	25	112	5	14	30	27	
57. Sundays and holidays	568		1,400		1,487		204	
58. Out of commission, nights	7,407		[1]4,469		4,041		7,375	
59. Miscellaneous			107	10	110		41	45
60. Total number of hours in year	8,760		8,760		8,760		8,760	

COST OF WORK.												
Dredge.												
61. Pay rolls	$3,439.69			$6,000.37			$6,629.24			$2,550.04		
62. Coal	[1] 262.90			1,721.03			1,948.23			1,772.45		
63. Supplies:												
(*a*) Subsistence	....			....			2,010.88			564.68		
(*b*) Machinery	11.36			69.55			190.87			138.46		
(*c*) Miscellaneous	....			61.61			1,710.02			67.01		
64. Renewals or additions to outfit, property, and rope.	474.05			849.48			3,606.05			484.64		
65. Ordinary repairs:												
(*a*) Hull	51.72			294.36			....			440.27		
(*b*) Machinery	....			1,301.01			1,241.42			371.89		
66. Laundry, ice, miscellaneous	....			19.14			347.15			23.00		
67. Total		$4,239.72			[2] $10,316.55			$17,683.86			$6,412.44	
Towboat.												
68. Operating cost for year	1,658.25			7,223.04			1,522.12			3,908.74		
69. Ordinary repairs	....			551.73			....			268.57		
Total		1,658.25			7,774.77			1,522.12			4,177.31	
Barges and scows.												
70. Ordinary repirs	569.88			392.49			....			6.25		
71. Total		569.88			392.49			19,205.98			6.25	
72. Total field cost			$6,467.85			$18,483.81			$19,205.98			$10,596.00
Gross cost.												
73. Office expenses, superintendence, surveys, etc.			226.38			....			465.88			1,951.44
74. Extraordinary repairs to dredge:												
(*a*) Hull			....			....			1,220.02			....
(*b*) Machinery			....			....			72.62			....
75. Extraordinary repairs to towboats and launches.			....			905.33			....			....
76. Extraordinary repairs to barges and scows.			....			....			....			....
77. Grand total			6,694.23			19,389.14			20,964.50			12,547.44

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Cascade.*	*Casey.*	*Grossetete.*	*Hercules.*
COST OF WORK—continued.				
Cost per cubic yard.				
78. Field cost per cubic yard:				
(*a*) Mud or sand	$0.144	$0.1523	$0.112	$0.101—.
(*b*) Rock			$3.38 (for obstruction)	$4.50.
79. Gross cost per cubic yard:				
(*a*) Mud or sand	$0.149	$0.1601	$0.122	$0.12.
(*b*) Rock			$3.67 (for obstruction)	$5.
Miscellaneous.				
80. Fuel consumed by dredge in long tons.	61 cords wood	324.69	381.10	265.
81. Fuel consumed by auxiliary plant in long tons.		557		50.
82. Cost per hour of effective working time.	$9.37	$4.50	$9.68	$16.23.
83. Cost of fuel per ton	$4.30 per cord	$4.155	$5.12	$6.70—.
84. Number of days in commission	150	262	302	140.
85. Number of shifts worked per day				
	Remarks.	***Remarks.***	***Remarks.***	***Remarks.***
	[1] Cord wood. Tug rented complete.	[1] Nights and days. [2] $784.90 of this amount not chargeable to dredging.	No attendant drill boats. This dredge removed 68 logs, 1,254 stumps, 557 snags, 54 trees, and 5 piles, or a total of 1,938 obstructions in addition to material dredged during the year.	No drill boat was operated in connection with the machine.

Name, letter, or number	*Omro.*	*Oshkosh.*	*Rosecrans.*[1]	*Scuppernong.*
1. District	Milwaukee, Wis.	Milwaukee, Wis.	Wheeling, W. Va.	Wilmington, N. C.
2. Length	100 feet	75 feet	111 feet	78 feet.
3. Beam	30 feet	31 feet	22 feet (28 feet 6 inches over all)	32 feet.
4. Depth	6 feet	6 feet	5 feet	7 feet.
5. Draft:				
(*a*) Forward	1 foot 8 inches	4 feet	3 feet	2 feet 8 inches.
(*b*) Aft	2 feet 1 inch	do	do	Do.
6. Displacement	150 long tons	284 long tons	200 tons	186 tons.
7. Builder:				
(*a*) Hull and material of hull	Wood [1]	Bucyrus Co., South Milwaukee, Wis.; wood.	Ohio River Contract Co.; wood	U. S. Engineer Department.
(*b*) Machinery	Unknown	Bucyrus Co	Goodman Engine & Machine Co.	New Jersey Foundry & Machine Co.
8. Where built	Portage, Wis.	Hull, Green Bay; machinery, South Milwaukee.	Dam No. 3, Ohio River	Newbern, N. C.
9. When built	1878	1905-06	1907	1904.
10. Time to build	Unknown	1 year 3 months	4 months	6 months.
11. Contract cost		$27,500	Unknown	Built by U. S. Engineer Department at $10,300.
12. Finished cost with outfit (exclusive of barges, tugs, and launches).		$28,029	do	$10,700.
13. Where purchased			Dam No. 26, Ohio River	
14. When purchased			1910	
15. From whom purchased			Ohio River Contract Co.	
16. Purchase price	$5,500		$12,000	
17. Bucket:				
(*a*) Type	Grapple (Lancaster)	Chain buckets with teeth	26 digging buckets	Orange peel.
(*b*) Capacity	2½ cubic yards	38 buckets, 5 cubic feet each	4 bushels each	2½ cubic yards.
18. Length of boom and material	60 feet; wood	No boom	65 feet; wood	56 feet; wood.
19. Maximum dredging depth		10 feet	25 feet	About 15 feet.
20. Dimensions of main hoisting-engine cylinders.	8-inch diameter; 12-inch stroke	9 inches diameter; 12-inch stroke	9 by 36 inches	7 by 12 inches.
21. Dimensions of swinging engine		6 by 6 inches		
22. Boilers:				
(*a*) Number	1	1	1	1.
(*b*) Type	Scotch marine; Adamson furnace, 38 inches diameter.	Scotch marine, with 2 Adamson furnaces.	Cylindrical flue	Scotch marine.
(*c*) Dimensions	10 feet 8 inches long; 84 inches diameter.	10 feet long, 108 inches diameter.	40 inches by 20 feet	Diameter, 8 feet; length, 10 feet.
(*d*) Number, diameter, and length of tubes in one boiler.	80; 3 inches diameter: 8 feet 6½ inches long.	150; 3 inches by 7 feet 6½ inches	6; 9 inches; 20 feet	106; 3½ inches by 8 feet.
(*e*) Heating surface (total)	680 square feet	1,070 square feet	434 square feet	125 square feet.
(*f*) Grate surface (total)	17 square feet	35 square feet	25 square feet	25 square feet.
(*g*) Working steam pressure	110 pounds	125 pounds	120 pounds	130 pounds.

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Omro.*	*Oshkosh.*	*Rosecrans.*[1]	*Scuppernong.*
ATTENDANT PLANT.				
Towboats.				
23. Name of tug attached to dredge	Fox and Wolf	Fox and Wolf	Gen. Craighill	
24. Owner	United States	United States	United States	
25. Number of crew	Fox, 7; Wolf, 5	Fox, 7; Wolf, 5	7	
Launches.				
26. Name				
27. Number of crew				
Scows.				
28. Number of scows in use	2	5	9 flats and barges pertaining to this work are used indiscriminately.	
29. Type	Flat pontoon and barge	(1)		
30. Capacity (each)	Pontoon, 20 tons; barge, 80 tons	(2)		
31. Identifying letters or numbers	No. 4 and barge Berlin	(3)		
WORK PERFORMED.				
32. Location of dredging	Fox River improvement	Fox River improvement	½ to 2 miles from work	
33. Average depth before dredging	3.5 feet	5.5 feet	6 feet	
34. Average depth after dredging	5.6 feet	6.8 feet	25 feet or less, depending upon elevation of rock.	
35. Average width of cut	50 feet	100 feet	3 feet at bottom	
36. Total distance cut ahead by dredge in feet.	10 feet (without moving dredge)	10 feet (without moving dredge)		
37. Total amount dredged in cubic yards during year:				
(a) Rock; (1) unit cost			(a) 19.119, gravel; (1) 36.83 cents.	
(b) Sand and mud; (2) unit cost	(b) 56.155; (2) 5.04 cents	(b) 81.642; (2) 6.8 cents	(b) 9.238, sand; (2) 36.83 cents	
38. Average number of cubic yards dredged:				
(a) Per day	488	770	210	
(b) Per hour	67	106	26.25	
39. Maximum number of cubic yards dredged:				
(a) In one day	900	972	315	
(b) In one hour	112.5	148	39.4	

40. Average number of hours worked per day.	7.3		7.24		8			
41. Total number of days upon which any dredging was done.	115		106		90			
42. Average distance in miles from work to dump.	1 mile and material banked		Material banked					
43. Number of scows loaded during year.	15							
44. Number of scows loaded per day	4							
45. Average time to load one scow	2 hours				2 hours for gravel, 5 hours for sand.			
46. Average load in cubic yards per scow.	75				50 of gravel, 60-65 of sand			
46½. Average time to tow load to dump and return.	1 hour				Not applicable to sand digger			
47. Number of scows per tow	1				1 to 3			
48. Character of dredged material and average percentage:								
(a) Mud	10		20					
(b) Rock								
(c) Sand	90		80		33⅓ per cent sand, 66⅔ per cent gravel.			
Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
49. Dredging	839		768		7			
50. Waiting on tug								
51. Spudding up						30		
52. Miscellaneous	68		72			30		
Distribution of time lost in hours.								
53. Repairing:								
(a) Hull	4		3		(2)			
(b) Machinery, and cleaning boiler	45		81		(2)			
54. Bad weather	10		50		(2)			
55. Changing location of plant	67		46		(2)			
56. Delays	59		36		(2)			
57. Sundays and holidays	204		188		(2)			
58. Out of commission, nights	7,464		7,536		(2)		8,760	
59. Miscellaneous					(2)			
60. Total number of hours in year	8,760		8,760		8,760		8,760	

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Omro.*			*Oshkosh.*			*Rosecrans.*			*Scuppernong.*		
COST OF WORK.												
Dredge.												
61. Pay rolls	$1,866.50			$3,430.36			$4,282.63			....		
62. Coal	465.95			1,563.25			1,125.50			....		
63. Supplies:												
(a) Subsistence	....			....			....			....		
(b) Machinery	19.59			90.21			47.48			....		
(c) Miscellaneous	12.34			13.80			102.73			....		
64. Renewals or additions to outfit, property, and rope.	....			....			299.05			....		
65. Ordinary repairs:												
(a) Hull	1.62			29.64			570.65			....		
(b) Machinery	45.20			36.24			2,709.92			....		
66. Laundry, ice, miscellaneous	....			....			57.66			$150.00		
67. Total		$2,411.20			$5,163.50			$9,195.62			$150.00	
Towboat.												
68. Operating cost for year	419.84			391.66			(3)			....		
69. Ordinary repairs	....			....			(3)			....		
Total		419.84			391.66			....			....	
Barges and scows.												
70. Ordinary repairs	....			....			1,148.31			....		
71. Total		....			....			1,148.31			....	
72. Total field cost			$2,831.04			$5,555.16			$10,343.93			$150.00
Gross cost.												
73. Office expenses, superintendence, surveys, etc.			85.00			95.00			....			....
74. Extraordinary repairs to dredge:												
(a) Hull			410.99			220.26						
(b) Machinery			417.39			3,310.16			....			....
75. Extraordinary repairs to towboats and launches.			....			....			....			....
76. Extraordinary repairs to barges and scows.			8.07			2,196.60			....			....
77. Grand total			[illegible]			11,377.18			10,343.93			150.00

Cost per cubic yard.				
78. Field cost per cubic yard:				
(*a*) Mud or sand	5.04 cents	6.8 cents	36.83 cents for sand and gravel	
(*b*) Rock				
79. Gross cost per cubic yard:				
(*a*) Mud or sand	6.70 cents	13.9 cents	36.83 cents	
(*b*) Rock			do	
Miscellaneous.				
80. Fuel consumed by dredge in long tons	64	231.7	322	
81. Fuel consumed by auxiliary plant in long tons.	272.5	272.5	(³)	
82. Cost per hour of effective working time	$4.14	$13.54	Not applicable in this case [1]	
83. Cost of fuel per ton	$7.28	$6.74	$3.50 to $4	
84. Number of days in commission	162	153	205	
85. Number of shifts worked per day				
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	[1] Rebuilt by United States in 1907–8.	[1] 2 flat carrying conveyors, 2 flat 20-ton pontoons, and 1 200-ton coal barge. [2] Flat carrying conveyors, 50 tons each; flat pontoons, 20 tons each; coal barge, 200 tons. [3] Delivery scow, intermediate scow No. 2, pontoon scows Nos. 2 and 3, and barge Kaukauna.	[1] The Rosecrans is a ladder-type sand digger and not a dredge. For that reason a considerable portion of the data required on this form does not apply in this case. This boat was employed at Dam No. 22, Ohio River, digging sand and gravel for construction work. [2] Have no data because of the nature of the employment of this craft. [3] See report for steamer Craighill.	Dredge has been out of commission all year.

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Tishomingo.*		*No. 1.*	*Clamshell derrick barge.* [1]
1. District	Chattanooga, Tenn.	Nashville, Tenn.	Kansas City, Mo	Montgomery, Ala.
2. Length	100 feet		92 feet	80 feet.
3. Beam	44 feet		30 feet	22 feet.
4. Depth	Forward, 5 feet 5 inches; aft, 5 feet 7 inches.		4 feet 4 inches	4 feet 2 inches.
5. Draft:				
(a) Forward	3 feet 8 inches		18 inches	1 foot.
(b) Aft	3 feet		do	Do.
6. Displacement	481 long tons		120 long tons	30 tons.
7. Builder:				
(a) Hull and material of hull	U. S. Engineer Department; wood.		United States	U. S. Engineer Department; wood.
(b) Machinery	Vulcan Steam Shovel Co			Thomas Carlin's Sons (hoisting engine); Lidgerwood Manufacturing Co. (swinging engine).
8. Where built	Hull, Muscle Shoals Canal, Ala.		Rebuilt at Lock and Dam No. 1.	Gulfport, Miss.
9. When built	1912		Rebuilt 1911, Osage River	1907.
10. Time to build	12 months		8 months	No record.
11. Contract cost	Machinery, $16,225			$4,007.50.
12. Finished cost with outfit (exclusive of barges, tugs, and launches).	$37,068		$3,360	
13. Where purchased	Machinery, Toledo, Ohio			Gulfport, Miss.
14. When purchased	Machinery, 1912			1907.
15. From whom purchased	Machinery, Vulcan Steam Shovel Co.			
16. Purchase price		$17,750, by transfer from Chattanooga district, July, 1917.		
17. Bucket:				
(a) Type	Orange peel		Clam shell; orange peel	Clamshell.
(b) Capacity	2 cubic yards		Clam shell, 1 cubic yard; orange peel, ¾ cubic yard.	¾ yard.
18. Length of boom and material	100 feet (steel)		50 feet	50 feet; pine.
19. Maximum dredging depth	16 feet		Indefinite	4 feet.
20. Dimensions of main hoisting-engine cylinders.	12 by 16 inches		7 by 12 inches	8 by 10 inches.
21. Dimensions of swinging engine	7 by 10 inches			8 by 10 inches.
22. Boilers:				
(a) Number	1		1	1.
(b) Type	Locomotive		Locomotive	Upright.
(c) Dimensions	60 inches diameter, 16 feet long		14 feet 6 inches by 4 feet	4 by 8½ feet.
(d) Number, diameter, and length of tubes in one boiler.	116; 2½ inches diameter; 11 feet long.		54 tubes 3 inches by 9 feet 5 inches.	198; 1½-inch flues 6 feet long.
(e) Heating surface (total)	985 square feet		468.75 square feet	477 square feet.
(f) Grate surface (total)	16 square feet		15.75 square feet	11 square feet.
(g) Working steam pressure	125 pounds		80 pounds	90 pounds.

ATTENDANT PLANT.				
Towboat.				
23. Name of tug attached to dredge		Steamer Warioto when necessary to move or haul supplies.	United States steamer Osage[1]	
24. Owner		U. S. Engineer Department	United States	
25. Number of crew		7-9	3	
Launches.				
26. Name			Racket	
27. Number of crew			1	
Scows.				
28. Number of scows in use			None	
29. Type				
30. Capacity (each)				
31. Identifying letters or numbers				
WORK PERFORMED.				
32. Location of dredging		See remarks.	Osage River, mile 78 to 103	Dam No. 5, Coosa River, Ala.
33. Average depth before dredging		3½ feet to 5 feet	16 inches	2 feet.
34. Average depth after dredging			36 inches	3.5 feet.
35. Average width of cut		135 feet	52 inches	40 feet.
36. Total distance cut ahead by dredge in feet.		5,798	7,708	1,000 feet.
37. Total amount dredged in cubic yards during year:				
(*a*) Rock; (1) unit cost				(*a*) 3,980; (1) $0.68.
(*b*) Sand and mud; (2) unit cost		(*b*) 165,050; (2) $0.062	(*b*) 24,886	
38. Average number of cubic yards dredged:				
(*a*) Per day		1,065	209	120.
(*b*) Per hour		147.5	28	15.
39. Maximum number of cubic yards dredged:				
(*a*) In one day		4,265	540	200.
(*b*) In one hour		487	70	25.
40. Average number of hours worked per day.		7.8	7½	8.
41. Total number of days upon which any dredging was done.		155	119	33.
42. Average distance in miles from work to dump.			Material cast over	
43. Number of scows loaded during year			None	
44. Number of scows loaded per day				
45. Average time to load one scow				
45. Average load in cubic yards per scow				

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Tishomingo.*				*No. 1.*		*Clamshell derrick barge.*	
WORK PERFORMED—continued.								
46½. Average time to tow load to dump and return.								
47. Number of scows per tow								
48. Character of dredged material and average percentage:								
(*a*) Mud			6.2				100 per cent.	
(*b*) Rock								
(*c*) Sand			93.8		100 per cent			
Distribution of effective working time in hours.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
49. Dredging			1,119		892	30	178	
50. Waiting on tug								
51. Spudding up			68		59	30		
52. Miscellaneous							2,172	
Distribution of time lost in hours.								
53. Repairing:								
(*a*) Hull	208						80	
(*b*) Machinery, and cleaning boiler			34		16		224	
54. Bad weather			704					
55. Changing location of plant			255		96		10	
56. Delays			24					
57. Sundays and holidays	120		1,352		472		744	
58. Out of commission, nights	416		4,460		1,384		5,352	
59. Miscellaneous	[1] 8,016		[1] 744					
60. Total number of hours in year.	8,760		8,760		2,920		8,760	
COST OF WORK.								
Dredge.								
61. Pay rolls	$131.18		$3,652.41		$1,225.24		$1,020.64	
62. Coal	32.50		1,003.68		111.21		490.44	

63. Supplies:												
(a) Subsistence	36.00			1,434.94			505.46			474.13		
(b) Machinery	....			871.19			21.32			19.56		
(c) Miscellaneous	5.00			389.41			16.72			38.83		
64. Renewals or additions to outfit, property, and rope.	....			....			....			....		
65. Ordinary repairs:												
(a) Hull	....			272.42			110.60			31.56		
(b) Machinery	142.90			397.63			152.66			158.17		
66. Laundry, ice, miscellaneous	2.00			47.00			455.26			7.59		
67. Total		$352.58			$8,668.65			$2,631.50			$2,839.92	
Towboat.												
68. Operating cost for year	....			$1,364.83			367.41			....		
69. Ordinary repairs	....			150.00			....			....		
Total		....			1,514.83			367.41			....	
Barges and scows.												
70. Ordinary repairs	....			....			$359.20			....		
71. Total		....			....			359.20			....	
72. Total field cost			....			$10,183.48			$3,358.11			$2,839.92
Gross cost.												
73. Office expenses, superintendence, surveys, etc.			$29.00			....			184.91			395.15
74. Extraordinary repairs to dredge:												
(a) Hull			....			....			....			463.68
(b) Machinery			....			....			....			....
75. Extraordinary repairs to towboats and launches.			....			....			....			....
76. Extraordinary repairs to barges and scows.			....			....			....			....
77. Grand total			381.58			10,183.48			3,543.02			3,698.75
Cost per cubic yard.												
78. Field cost per cubic yard:												
(a) Mud or sand	....			6.2 cents			13.49 cents					
(b) Rock	....			....			....			52.4 cents.		
79. Gross cost per cubic yard:												
(a) Mud or sand	....			6.2 cents			14.24 cents					
(b) Rock	....			....			....			68 cents.		

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*Tishomingo.*		*No. 1.*	*Clamshell derrick barge.*
MISCELLANEOUS.				
80. Fuel consumed by dredge in long tons.	8	303.5	Wood	138.6.
81. Fuel consumed by auxiliary plant in long tons.			do	None.
82. Cost per hour of effective working time.		$8.58	$3.96	$1.57.
83. Cost of fuel per ton	$4.06	$5.28 per long ton	Wood used	$3.53.
84. Number of days in commission		154	119 eight-hour days	198.
85. Number of shifts worked per day				1.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
	Transferred to Nashville district, January, 1917; operating expenses incurred in care of plant. No drill unit cost included in above. [1] Transferred to Nashville district.	No drill units used with this plant. This boat was transferred from Chattanooga district in January, 1917, and was then used in connection with work at Lock E, Cumberland River. It was then put into service cleaning channel and locks above Nashville and between Nashville and Lock A. [1] In Chattanooga district prior to transfer.	[1] Towboat used only for moving dredge from shoal to shoal. Crew used part of time in quarrying rock and building dams. [2] Operating cost for launch.	This plant was engaged throughout the working season in dredging stone at a field cost of $2,085.52 and a gross cost of $2,715.26, and in placing stone in Dam No. 5, Coosa River, Ala., at a total cost of $983.49. There was no attendant plant attached to this dredge. [1] Formerly barge No. 15.

Name, letter, or number	*B-1.*	*B-3.*	*B-5.*
1. District	Fourth, Mississippi River	Fourth, Mississippi River	Fourth, Mississippi River.
2. Length	110 feet	110 feet	(1).
3. Beam	40 feet	42 feet	
4. Depth	7 feet 3 inches	7 feet 6 inches	
5. Draft:			
(a) Forward	3 feet	3 feet 1 inch	
(b)	do	2 feet 9 inches	
6. Displacement	341 tons	442 tons	
7. Builder:			
(a) Hull and material of hull	U. S. Engineers, wood	Bucyrus Co., South Milwaukee, Wis	
(b) Machinery	McMyler Co., Cleveland, Ohio	do	Bucyrus Co., South Milwaukee, Wis.
8. Where built	New Orleans, La	New Orleans, La	New Orleans, La.
9. When built	1913–14	1914–15	1917.
10. Time to build	4 months	5 months	5 months.
11. Contract cost			$52,000.
12. Finished cost with outfit (exclusive of barges, tugs, and launches).	$30,315.85	$54,233	$82,000.
13. Where purchased			
14. When purchased			
15. From whom purchased			
16. Purchase price			
17. Bucket:			
(a) Type	3 buckets; 2 orange peel, Haywood, 1 Paige drag.	1 clamshell, 1 drag line, 2 orange peel	1 drag line.
(b) Capacity	1½ and 2 cubic yards, and 2½ drag	3 cubic yards, 3½ cubic yards, 3 and 2½ cubic yards.	5 cubic yards.
18. Length of boom and material	Steel; 100 feet	127 feet; steel	155 feet; steel.
19. Maximum dredging depth	50 feet	50 feet or more	50 feet or more.
20. Dimensions of main hoisting-engine cylinders.	12 by 16 inches	13 by 15 inches	13 by 15 inches.
21. Dimensions of swinging engine	do	10 by 10 inches	10 by 10 inches.
22. Boilers:			
(a) Number	1	1	1.
(b) Type	Vertical tubular	Locomotive type	Locomotive.
(c) Dimensions	13 feet 2 inches high, 74 inches diameter	23 feet long, 84 inches diameter	23 feet long, 84 inches diameter.
(d) Number, diameter, and length of tubes in one boiler.	136; 2½-inch tubes	176; 3-inch, 12 feet	176; 3-inch, 12 feet.
(e) Heating surface (total)	1,537 square feet	1,828 square feet	1,828 square feet.
(f) Grate surface (total)	17.1 square feet	46.28 square feet	46.28 square feet.
(g) Working steam pressure	100 pounds	125 pounds	125 pounds.
ATTENDANT PLANT.			
Towboat.			
23. Name of tug attached to dredge			
24. Owner			
25. Number of crew			

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*B-1.*	*B-3.*	*B-6.*
ATTENDANT PLANT—continued.			
Launches.			
26. Name			
27. Number of crew			
Scows.			
28. Number of scows in use			
29. Type			
30. Capacity (each)			
31. Identifying letters or numbers			
WORK PERFORMED.			
32. Location of dredging	Various levees	Various levees	Various levees.
33. Average depth before dredging			
34. Average depth after dredging			
35. Average width of cut			
36. Total distance cut ahead by dredge, in feet.			
37. Total amount dredged in cubic yards during year:			
(*a*) Rock; (1) unit cost			
(*b*) Sand and mud; (2) unit cost	(*b*) 305,425	(*b*) 665,608	(*b*) 54,900; (2) $0.0847.
38. Average number cubic yards dredged:			
(*a*) Per day	1,202.4	2,785	2,033.
(*b*) Per hour	82.6	166.7	112.3.
39. Maximum number of cubic yards dredged:			
(*a*) In one day	2,800	6,000	3,300.
(*b*) In one hour	140	333	206.
40. Average number of hours worked per day.	14.5	16.7	18.1.
41. Total number of days upon which any dredging was done.	254	239	27.
42. Average distance in miles from work to dump.			
43. Number of scows loaded during year			
44. Number of scows loaded per day			
45. Average time to load one scow			
46. Average load in cubic yards per scow			

46½. Average time to tow load to dump and return.						
47. Number of scows per tow						
48. Character of dredged material and average percentage:						
(a) Mud						
(b) Rock						
(c) Sand						
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
Distribution of effective working time in hours.						
49. Dredging	3,697		3,991		489	
50. Waiting on tug						
51. Spudding up						
52. Miscellaneous						
Distribution of time lost in hours.						
53. Repairing:						
(a) Hull						
(b) Machinery, and cleaning boiler	521		1,029		37	
54. Bad weather	9		28		20	
55. Changing location of plant	787		708		42	
56. Delays	743		553		110	
57. Sundays and holidays	1,572		1,596		216	
58. Out of commission, nights	44					
59. Miscellaneous	1,387		855		214	
60. Total number of hours in year.	8,760		8,760		8,760	
COST OF WORK.						
Dredge.						
61. Pay rolls	$23,197.46		$27,689.55		$2,275.76	
62. Coal	2,358.50		7,767.00		849.00	
63. Supplies:						
(a) Subsistence	2,840.34		6,959.49		879.66	
(b) Machinery	255.00		182.14			
(c) Miscellaneous	2,614.30		5,219.28		24.50	
64. Renewals or additions to outfit, property, and rope.	2,012.57		1,195.95			
65. Ordinary repairs:						
(a) Hull						
(b) Machinery	1,144.29		4,956.15			
66. ice, miscellaneous	269.38		4,206.28		437.70	
Total		$34,691.84		$58,175.84		$4,466.62

TABLE 7.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1917*—Continued.

Name, letter, or number	*B-1.*	*B-3.*	*B-6.*
COST OF WORK—continued.			
Towboat.			
68. Operating cost for year			
69. Ordinary repairs			
Total			
Barges and scows.			
70. Ordinary repairs	743.50		
71. Total	35,435.34		
72. Total field cost	$35,435.34	$58,175.84	$4,466.62
Gross cost.			
73. Office expenses, superintendence, surveys, etc.	6,789.11	1,937.48	184.00
74. Extraordinary repairs to dredge:			
(a) Hull			
(b) Machinery			
75. Extraordinary repairs to towboats and launches.			
76. Extraordinary repairs to barges and scows.			
77. Grand total	42,224.45	60,113.32	4,650.62
Cost per cubic yard.			
78. Field cost per cubic yard:			
(a) Mud or sand	11.60 cents	$0.0874	$0.0814.
(b) Rock			
79. Gross cost per cubic yard:			
(a) Mud or sand	13.82 cents	$0.0903	$0.0847.
(b) Rock			
Miscellaneous.			
80. Fuel consumed by dredge in long tons.	392.8	1.284	140.
81. Fuel consumed by auxiliary plant in long tons.			

82. Cost per hour of effective working time	$11.42	$15.06	$9.51.
83. Cost of fuel per ton	$6.05	$6.05	$6.05.
84. Number of days in commission	363	365	47.
85. Number of shifts worked per day	3	3	3.
	Remarks.	*Remarks.*	*Remarks.*
	This dredge is a levee building machine and is used for that purpose entirely.	The dredge is a levee building machine and only used for that purpose.	The dredge is a levee building machine and is used for that purpose entirely. [1] The same hull as for B-3 is used for transportation of the machine.

TABLE 8.

DRY DOCKS.

TABLE 8.—*Report of operations of dry docks for the calendar year ending Dec. 31, 1917.*

1. Letter or number	Lock 6, Muscle Shoals Canal, Ala.	Louisville & Portland Canal Dry Dock.	Kaukauna.		
2. District and location	Chattanooga, Tenn. (Muscle Shoals Canal, Ala.)	Louisville, Ky	Milwaukee, Wis	Mobile, Ala.; Pascagoula, Miss.	St. Louis, Mo., Mississippi River Commission.
3. Capacity in tons	1,780	1,200	575	1,500	1,500.
4. Cost of dock		Not known	$3,863	$38,546.57	$95,120.
5. Present value		$125,000		$38,000	$81,000.
TYPE.					
6. Stationary:					
(a) Location	Muscle Shoals Canal, Ala	Louisville & Portland Canal.	Kaukauna, Wis., lower Fox River.		
(b) Material	Concrete sides, rock bottom.	Masonry	Earth basin; bed rock floor		
(c) Length	171 feet	235 feet 6 inches	130 feet		
(d) Breadth	75 feet	80 feet	100 feet		
(e) Depth	7 feet	15 feet	6 feet		
7. Floating:					
(a) Location					
(b) Material					
(c) Length					
(d) Breadth					
(e) Depth					
(f) Maximum draft of vessel that dock will take.					
(g) Number and size of pumps.					
8. Side haul or end haul:					
(a) Location				West bank of Pascagoula River.	Right bank Mississippi River, West Memphis, Ark.
(b) Material				Yellow pine, creosoted	Timber, concrete and steel.
(c) Number of tracks				4	12.
(d) Number of carriages				1	6.
(e) Length of tracks				350 feet	314 feet 9 inches.
(f) Depth of water over end.				12 feet on top of 16-inch keel block.	16 feet 5 inches at zero stage Memphis gauge.
(g) Dimensions of chains.				2¼-inch hauling, 1⅛-inch backing	1¾ inches.
(h) Dimensions of hauling-engine cylinders.				10 by 12 inches	12 by 16 inches.

(*i*) Dimensions of boilers				44 inches diameter, 16 feet 8 inches long.	Steam from plant boiler house.
(*j*) Heating and grate surface of boilers.				478 square feet, 17 square feet.	Do.
9. Number of vessels docked during year.		36.	7.	25.	5.
10. Total displacement in tons of all vessels docked.		3,666.	755.	7,220.	3,377.
11. Number of days dock was employed.		276 days 10 hours.	205.	245.	181.
12. Average number of men employed.		6 to 12.		8 11/25.	
OPERATING COST.					
13. Pay roll.		$853.69.		$559.58.	
14. Supplies.				$25.52.	
15. Repairs.		$1,523.88[1].	$20.87.	$146.19.	$1,942.66.
16. Fuel.		$44.		$62.96.	Steam from power plant.
17. Average cost of docking and undocking per ton of displacement.		$0.66.	See remarks.	$0.11.	
	Remarks. Dock is used for repairs only and not used regularly, so no permanent force is employed and cost of docking and undocking is not kept, as the men employed on the repairs to the work and cost is included in the repairs, and is a very small per cent of the work.	*Remarks.* [1] Includes cost of additional blocks, etc., for increasing capacity of dock.	*Remarks.* This dry dock consists of a basin 100 by 130 feet adjacent to Kaukauna third lock, and is provided with regular lock gates. It is filled by gravity through valves in gates and emptied by gravity through culvert into pool below lock. No men are regularly employed. Cost of docking is nominal.	*Remarks.* This dock is operated in connection with the work at the shipyard at Pascagoula, Miss., and the men employed at this yard are taken from their duties to operate the dock when necessary.	

TABLE 8.—*Report of operations of dry docks for the calendar year ending Dec. 31, 1917*—Continued.

1. Letter or number	No number.		1015.	
2. District and location	First and second districts, Mississippi River Commission.	Mississippi River Commission, third district.	Fourth, Mississippi River, New Orleans.	Rock Island, Ill.; Keokuk, Iowa.
3. Capacity in tons	140	360	100	5,000.
4. Cost of dock	$9,475	$39,000	$5,000	Built by Power Co., $250,000.
5. Present value	$574.24	$30,000	$4,400	$250,000.
TYPE.				
6. Stationary:				
(*a*) Location				Adjoining lock at Keokuk, Iowa.
(*b*) Material				Concrete, stone, steel gates.
(*c*) Length				410 feet.
(*d*) Breadth				140 feet.
(*e*) Depth				11 feet on miter sill.
7. Floating:				
(*a*) Location	Memphis, Tenn	United States fleet, Vicksburg, Miss.	New Orleans, La	
(*b*) Material	Wood	Steel	Creosoted wood	
(*c*) Length	145 feet	158 feet 8 inches	103 feet	
(*d*) Breadth	36 feet	56 feet 5 inches	30 feet	
(*e*) Depth	10 feet	16 feet 3 inches	8 feet	
(*f*) Maximum draft of vessel that dock will take.	5 feet	8 feet	7 feet	
(*g*) Number and size of pumps	Pump on fleet tender used	2; 8-inch centrifugal	1; 6-inch centrifugal	
8. Side haul or end haul:				
(*a*) Location				
(*b*) Material				
(*c*) Number of tracks				
(*d*) Number of carriages				
(*e*) Length of tracks				
(*f*) Depth of water over end				
(*g*) Dimensions of chains				
(*h*) Dimensions of hauling-engine cylinders.				
(*i*) Dimensions of boilers				
(*j*) Heating and grate surface of boilers.				
9. Number of vessels docked during year.	18	35	2	55.
10. Total displacement in tons of all vessels docked.	5,921	$3,817.5	180	8,203.
11. Number of days dock was employed	331	218	20	358.
12. Average number of men employed	10 (1)	12	(1)	25.

OPERATING COST.				
13. Pay roll	$270	$456.50	$139.42	$975.82.
14. Supplies		$16.20	$16	
15. Repairs	$125.52	$78.90	$48	$54.47.
16. Fuel	(2)	$63	$25	
17. Average cost of docking and undocking per ton of displacement.	7 cents	$0.160	$1.27	4 cents per ton (dock fills and empties by gravity).
	Remarks. [1] Labor gang of fleet used for docking and undocking. Cost represents actual time employed. [2] Fleet steam tender used for pumping, and fuel cost not distributed.	*Remarks.* Dock operated by regular carpenter and machinist force at Vicksburg repair fleet. Carpenter boat No. O79 furnishes steam for pumping out dock.	*Remarks.* [1] Dock is operated from time to time, when necessary, by regular force at Engineer depot. At other times the men are engaged in other duties.	*Remarks.* The operating and repair costs consists of care of dry dock and buildings, painting traveler crane and roofs of all buildings, cutting weeds, repairing roads, and miscellaneous work. Of the 55 boats docked 4 were commercial boats, from which dockage fees, etc., were received: Dockage fees, $1,258.75; use of tools, $279; total, $1,537.75. All expenses charged in with construction and repair of boats. The estimated cost per ton is 4 cents.

TABLE 9.

BOAT-BUILDING PLANTS.

TABLE 9.—*Boat-building plants.*

1. District	Chattanooga, Tenn.		Cincinnati, Ohio, Second.		
2. Location	Chattanooga, Tenn.	Muscle Shoals Canal, Ala.	Near Fort Gay in West Virginia.	McConnelsville, Ohio	Lock 4, Kentucky River, near Frankfort, Ky.
3. Number of buildings	3	2	4	1	1.
4. Material of buildings	1 corrugated metal; 2 frame.	Wood	2 concrete and cement blocks and 2 frame.	Wood	Wood.
5. Usage of buildings	Warehouse, blacksmith shop, and sawmill.	Workman's shed and storeroom.	Construction and repair work.	Workshop	Fabrication of steel.
6. Cost of yard (completed)	$11,384 (estimated)		On Government ground; $500.		Old boat hull, $200; machinery, $2,500.
7. Cost of buildings	Warehouse, $3,649.92; others unknown.		$5,500	$2,473.66	$300.
8. Present value	Warehouse, $2,920		$5,000	$2,500	$3,000.
9. Acreage	About 2 acres	5½ acres	1 acre	2 acres available	.05
10. Number of men employed	21		7	From 6 to 12 when work in progress.	7.
11. Operating cost per year			Indefinite	Indefinite	Not regularly operated.
12. Character of work done	See remarks	Repair of floating plant	Construction of dam and boat parts and general repair work.	Constructing wooden barges, dump scows, hulls, lock gates, etc.	General repair work.
	Remarks. This boat yard built barges Nos. 87, 88, 89, and 90; dump scow No. 18; and drill raft No. 35 during the past year, and made extensive and minor repairs to various other pieces of floating plant.			*Remarks.* The principal use of the plant is for constructing and repairing lock gates and other lock appurtenances.	

1. District	Mobile, Ala.		Kansas City, Mo.		
2. Location	Tuscaloosa, Ala.	Pascagoula, Miss.	Rockhaven Ice Harbor, N. Dak.	Gasconade, Mo.	Sioux Ice Harbor, S. Dak.
3. Number of buildings	3	7	6	9	3.
4. Material of buildings	Wood	Wood, galvanized iron, and composition roofing.[1]	Wood, 4; concrete, 2	Wood and brick	Wood.
5. Usage of buildings	Storeroom, carpenter shop, and blacksmith shop.	Storerooms, protecting machinery, blacksmith shop, etc.	Residence, 3 warehouses, oil house, dynamite and powder house.	(1)	(1).
6. Cost of yard (completed)	$17,447.83	$47,575.33 [2]	No record	Not completed	No record.
7. Cost of buildings	$1,372.39	$2,189.85	do	No record	Do.
8. Present value	Building, $1,000; yard and ways, $14,000.	$47,000	$9,000 (estimated)	$26,600	$24,000 (estimated).
9. Acreage	3.7	4.6	11.21	17.86	9.
10. Number of men employed	26	17 to 76	Small force when work warrants.	50 to 150	2 watchmen regularly; small force when work warrants.[2]
11. Operating cost per year	$14,614	$37,783.61 [3]	Idle during 1917	$200,000 (estimated)[2]	Construction of and repairs to floating plant operating in the vicinity of Sioux City, Iowa.
12. Character of work done	See remarks	(4)	Construction of and repairs to floating plant operating in vicinity of Bismarck, N. Dak.	Construction and repairs of floating plant; also used as a supply yard for field parties.	
	Remarks. Work performed consisted of hauling out and repairing the various boats and barges in use on Black Warrior and Tombigbee Rivers, Ala.; rebuilding old barge; constructing steel barge and 1 derrick boat.	*Remarks.* [1] Two buildings have wood sides and composition roofing; the others have galvanized iron sides and roofs. [2] Includes cost of constructing marine ways. [3] Represents cost of doing work explained under item 12. [4] Hauled out and repaired the following plants: One seagoing hopper dredge; 2 hydraulic pipe-line dredges; the attendant plants of 3 hydraulic pipe-line dredges, consisting of tug boats, launches, pipe lines, coal and water barges, 2 snag boats, 1 survey launch, 1 steam despatch boat, 1 stern-wheel towboat, 2 privately owned seagoing tug boats, and 2 privately owned 3-masted schooners. Constructed 18 wooden pontoons and repaired 1 gasoline launch.		*Remarks.* A general harbor for plant operating between Kansas City and the mouth of the Missouri River and on the Osage and Gasconade Rivers. [1] Machine shop, mill, and blacksmith shop, oil house, dynamite house, ice house, warehouse, office and residence. [2] Includes cost of materials purchased for construction of and repairs to floating plant.	*Remarks.* [1] Warehouse, lumber shed, machine shop, carpenter shop. [2] Operating cost depends on work to be done. Practically idle during 1917.

TABLE 9.—*Boat-building plants*—Continued.

1. District	New Orleans (fourth Mississippi River).	Pittsburgh, Pa.	Rock Island, Ill.		
2. Location	New Orleans, La.	Lock 4, Pa	Fountain City, Wis	Keokuk, Iowa	Milan, Ill.
3. Number of buildings	2	9	10	10	12.
4. Material of buildings	Wood and galvanized iron	Wood and steel	Wood	3 brick, 7 wood	10 wood, 1 brick, and 1 wood frame sheet-iron covered.
5. Usage of buildings	Warehouse, machine and carpenter shops.	(1)	(1)	Tool, ice, and engine house, storehouse (2), machine and paint shop.	See below.
6. Cost of yard (completed)	About $20,000	$7,000	$36,187.90	See dry-dock report	$14,419.80.
7. Cost of buildings	$8,000	$24,269.96	$4,870	$30,000	$4,561.03.
8. Present value	$8,000	$65,000	$22,650.14	$28,000	
9. Acreage	About 10	Approximately 3	2.42	2	7.8.
10. Number of men employed	Variable, about 56	28 (average)	26 (average)	25	19 to 33.
11. Operating cost per year		$31,258.68	$13,915.21	$1,030.29	$29,952.86.
12. Character of work done	Construction and repair of wooden hulls, assembling steel hulls, assembling and erecting levee machines.	(2)	Repair and care of floating plant and storehouse for lighthouse supplies.	Construction and repair of floating plant.	Care, repair, and construction of United States floating plant; storehouse for engineer and lighthouse material, supplies, outfit and tools, and winter labor.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*	*Remarks.*
	The boat-building plant is operated in connection with the force employed at the engineer depot for the repair, maintenance and care of the plant of the district. There is no separate operating cost.	[1] Warehouse, boiler house, machine shop, forge shop, sawmill, planing mill, carpenter shop, office, and superintendent's residence. [2] Building and repairing boats, hulls, superstructures, machinery and flats; making general repairs to locks and dams; building and repairing lock gates; and repairing and rebuilding break in dam at Lock 4, Monongahela River. Building wickets, etc., for locks and dams on the Ohio and Allegheny Rivers. Also other miscellaneous repairs.	[1] Mill building, paint shop, creosote shed, ice house, and 6 storerooms.	This boat-building plant is part of the dry-dock equipment and is not a separate plant.	Answer to No. 5 above: One mill building, 1 boiler room (brick), 1 coal house, 1 oil shed, 2 storage sheds, 1 tool house, 1 experimental tank shed, 1 creosote office, 1 cook house, 1 blacksmith shop (sheet-iron covered), 1 office and storeroom in three sections. The plant includes a 4-cradle boatways with an out to out width of 108 feet; each cradle is 12 feet wide, 30 feet long, mounted on 20 cast-iron wheels; main timbers fitted with iron rails

					for cradle track; motive power 5-horse with 5 crabs. Boatways are for emergency work. Usual method of docking and launching is by raising and lowering water in lower level of Milan section, Illinois and Mississippi Canal, of which the boatyard is a part, and floating boats and barges on and off the bank. Acreage of boatyard includes 3.9 acres dockage space.

TABLE 9.—*Boat-building plants*—Continued.

1. District	St. Louis, Mo.	Vicksburg (third district, Mississippi River).
2. Location	St. Louis, Mo.	Vicksburg, Miss.
3. Number of buildings	12.	2.
4. Material of buildings	6 steel, 6 wood	Creosoted pile foundation; wood and galvanized-iron houses.
5. Usage of buildings	([1])	Warehouses and machine shop.
6. Cost of yard (completed)	Land owned by Quartermaster Corps	$24,832.75.
7. Cost of buildings	$30,000	$21,832.75.
8. Present value	$7,500	$20,000.
9. Acreage	8¼	About 6 acres at low water.
10. Number of men employed	100 to 200 (on repairs)	100 to 200.
11. Operating cost per year		$250,000.
12. Character of work done	Repairs to snagboats, steamboats, and dredges; repairs to and reconstruction of steam tenders, derrick boats, quarter boats, office boats, barges, flat boats, skiffs, and yawls.	Repairing boats and barges and building new barges; general repairs to machinery in third district.
	Remarks. At this engineer depot all materials, supplies, tools, and appliances, and subsistence stores are collected throughout the district. Contains a small laboratory for testing coal, materials, and supplies.	*Remarks.* This property was acquired in order to transfer storehouse and shop buildings from floating hulls to the bank. It is expected to transfer all shop buildings to the shore when the hulls on which they are now maintained become unserviceable.

[1] 1 steel boiler room, engine room, machine shop, blacksmith shop, and sawmill; 1 steel, sheet-iron and boiler shop; 1 steel paint shop; 1 steel warehouse; 1 steel lumber shed; 1 steel coal shed; 2 wood warehouses, ship stores, commissary stores, mess and kitchen outfit; 2 wood carpenter shops; 1 wood office; 1 marine ways for light vessels.

TABLE 10.

CONTRACT DREDGING BY HYDRAULIC DREDGES.

TABLE 10.—*Contract dredging by hydraulic dredges during the calendar year ending Dec. 31, 1917.*

1. District.	Baltimore, Md.	Jacksonville, Fla.			New York, first district.
2. Name of dredge	Gray Eagle	Florida	Atlantic	San Diego	Mohawk.
3. Location of dredging	Little Elk River, Md	Biscayne Bay, Fla	St. Johns River, Jacksonville to ocean.	St. Johns River, Fla., Jacksonville to ocean.	Hudson River at Albany, N. Y.
4. Average depth of water	7 feet	6 feet to 10 feet	25 feet before, 30 feet after	Before 25 feet, after 30	10 feet at lowest low water.
5. Name of contractor	W. H. French Dredging & Wrecking Co. (Inc.).	Bowers Southern Dredging Co.	Standard American Dredging Co.	Standard American Dredging Co.	American Pipe & Construction Co.
6. Date of award of contract	June 26, 1917	Sept. 26, 1916	Sept. 7, 1915	Sept. 7, 1915	July 7, 1917.
7. Percentage of completion	100	(1)	96	96	91.
8. Probable date of completion of contract.	Completed	(2)	Indefinite[1]	Indefinite[1]	June 1, 1918.
9. Total amount of contract	$7,543.15	$165,124.56	$230,000	$230,000	$96,720.
10. Cost per cubic yard	25 cents	Rock, $0.86; sand, $0.20	(2)	(2)	$0.312.
11. Total number of yards to be removed under this contract.	30,079	325,285, approximate	180,000 cubic yards	180,000 cubic yards	310,000 exclusive of overdepth.
12. Total number of cubic yards removed during the calendar year.	30,079	6,108 cubic yards	1,108 cubic yards original, 1,507 cubic yards filled.	Original material, 8,280; filled, 4,320 cubic yards.	261,692.2 (this plant).
13. Amount paid to contractor during calendar year.	$7,543.15	$109,147.54	$21,991.95	$21,991.95	$83,007.97 (total).
14. Linear feet of bulkheads constructed during year.		None	None	None	None.
15. Average length of pipe line	500 feet	480 feet	800 feet	800 feet	2,000 feet.
16. Diameter of pipe line	12-inch	12-inch	25-inch suction, 22-inch discharge.	22-inch	20-inch.
17. Average number of yards pumped per month.	30,000	17,246	Not operated month, previous year average, 22,502.	6,300 cubic yards	60,900.
18. Character of material	Sand and mud	Sand	Rock, sand, some clay	Sand and rock, some clay.	Sand and gravel.
19. Brief description of dredge and attendant plant.	Dredge, coal and water tender and towboat.	(2)	(3)	(3)	Wooden hull, 140 by 40.7 by 10.2 feet; draft, 6.5 feet; engine, 3 cylinder, 15 by 26 by 36 inches. Stroke, 18.4 inches; water tube boiler; horsepower, 720.
		Remarks. [1] This plant was used to remove the overburden of soft material ahead of the dipper dredge, Governor Herrick, and its work is complete. [2] Wood hull, barge type, 100 by 26 by 8 feet; draft, 5	*Remarks.* [1] This dredge lost its rock cutter on Jan. 10, and since that time has been laid up. No work on the contract has been done since Feb. 25, when the contractors' other dredge was removed from	*Remarks.* [1] This dredge was taken from the work Feb. 25, and no work has been done on this contract since. [2] Original material to 30 feet, 97.8 cents per cubic yard; original material, 30	*Remarks.* Under contract with American Pipe & Construction Co., there were removed 291,692.2 cubic yards of material, at $0.312 per cubic yard, at a contract value of $91,007.97. There re-

feet. With quarters and galley, 12-inch centrifugal pump, belt driven, by 125-horsepower engine; cutter is revolving spiral, operated through gears by an engine on ladder. Boiler is 11 by 12 feet, Scotch marine.

the work on account of the ladder being racked from use.

[3] Original material to 30 feet, 97.8 cents per cubic yard. Original material, 30 to 31, 48.9 cents; filled material, 12 cents.

[3] Molded steel, hull, 160 by 302 by 12 feet; triple expansion engine, 1,100 horsepower, 25-inch centrifugal pump, ladder 60 feet long. Rock cutter, revolving, with removable teeth, water tube boilers; self-propelling; one 75-horsepower gasoline tender; 1 fuel barge, 1 water barge, 1 blacksmith barge.

to 31 feet, 48.9 cents; filled material 12 cents.

[3] Wooden hull, 149¾ by 40 by 12¾ feet. Drafts forward, 8 feet; aft, 7 feet. Dredging pump, 24-inch suction, 22-inch discharge. Pumping engine, triple expansion, two high pressure cylinders, 1,280 horsepower. The pumping engine also operates the cutter by means of a chain belt and universal couplings through a parallel shaft; attendant plant, 2 gasoline towboats, fuel barge, water barge, work barge.

mains to be removed under this contract approximately 30,000 cubic yards. The amount available for expenditure under this contract is approximately $64,000. Attendant plant, one small tug and coal scow.

TABLE 10.—*Contract dredging by hydraulic dredges during the calendar year ending Dec. 31, 1917*—Continued.

1. District	New York, second district.		New York, third district.		
2. Name of dredge	Dobey	Geo. W. Catt	No. 17	Washington	Massachusetts.
3. Location of dredging	Brown's Creek, N. Y.	Jamaica Bay, Rockaway Beach.	Staten Island Sound, N. Y. and N. J.[1]	Newark Bay and Passaic River, N. J., from deep water in Newark Bay to about 2,000 feet above the Plank Road Bridge.	Passaic River, N. J, between Jackson and Bridge Streets.[1]
4. Average depth of water	4 feet	Reclamation work	21 feet in channel, 16.3 feet[2]	15 to 21 feet dredged to 21 feet mean low water.	12 to 16 feet dredged to 17 feet mean low water.
5. Name of contractor	Tuttle & Raynor	Atlantic Gulf & Pacific Co.	P. Sanford Ross (Inc.)	L. T. Gaylord	The Great Lakes Dredge & Dock Co.
6. Date of award of contract	Apr. 29, 1916	Apr. 28, 1917	May 15, 1916	Mar. 27, 1916	Apr. 11, 1917.
7. Percentage of completion	Completed Jan. 15, 1917	100	36.3	100	76.
8. Probable date of completion of contract.	Jan. 22, 1917	Nov. 10, 1917	Oct. 22, 1918	Completed June 4, 1917	Nov. 18, 1917; time limit waived.
9. Total amount of contract	$7,694.36	$180,914.68	$280,125	$119,700	$84,800.
10. Cost per cubic yard	17 cents place measurement.	13 8/10 cents per cubic yard	12.45 cents per cubic yard, scow measurement.	13.3 cents per cubic yard, scow measurement.	40 cents per cubic yard, scow measurement.
11. Total number of yards to be removed under this contract.	12,550 cubic yards	1,309,970 cubic yards	2,250,000 cubic yards, scow measurement.	900,000 cubic yards, scow measurement; 985,410 cubic yards actually removed.	212,000 cubic yards, scow measurement.
12. Total number of cubic yards removed during the calendar year.	23,734	do	725,108	266,355 cubic yards under contract; 238,497 cubic yards by this dredge.	162,036 cubic yards, scow measurement.[1]
13. Amount paid to contractor during calendar year.	$5,418.30		$77,171.43	$46,366.23	$53,975.33.
14. Linear feet of bulkheads constructed during year.	None	1,000 feet (approximately)	No record kept	No record kept	No record kept.
15. Average length of pipe line.	700 feet	1,000 feet steel pontoon line	1,000 feet	500, 2,000 feet	1,000 feet.
16. Diameter of pipe line	12 inches	27 inches	20 inches	22 inches	20 inches.
17. Average number of yards pumped per month.	(1)	220,000	60,500 cubic yards	178,872 cubic yards by this dredge.	44,192 cubic yards on this contract.[1]
18. Character of material	Mud, silt, sand	Sand	Mud, sand, gravel, clay, hardpan.	Mud and sand	Silt, mud, sand, clay, and stone.
19. Brief description of dredge and attendant plant.	Dredge, water boat, coal boat, small launch.	One tug as tender and two barges for water and fuel supply.	Hydraulic dredge, hull 153 by 42 feet.[3]	(1)	(2).
	Remarks.		*Remarks.*	*Remarks.*	*Remarks.*
	[1] The dredge worked less than one month (in January) consequently no accurate monthly average can be given		[1] In vicinity of Carteret and Chrome. [2] In turning basin, 26 to 27 feet after dredging. [3] Draft 6 feet, engine 14½ by 23 by 40½ inches, 20-inch	[1] Hydraulic dredge, hull 130 by 36 feet; draft 7 feet 5 inches; engine 15 by 28 by 46 inches, 18-inch stroke; intake diameter 23 inches; discharge 22 inches; pump	[1] This pump was used in connection with the contract for disposing of material dredged in scows by dipper dredge No. 52. This dredge was stationed below

			stroke, diameter of intake and discharge 20 inches, centrifugal pump. Attended by a tug, gasoline launch, coal and water boat, pipe lines, pontoons, etc. 1,432,590 cubic yards, scow measurement remain to be removed. 817,410 cubic yards, scow measurement, have been removed at a total cost of $91,509.85, exclusive of retained percentage, inspection and overhead cost. Amount available $178,357.44.	centrifugal, diameter record 18 inches, width 18 inches, horsepower 550. Attended by several gasoline tugs and launches, coal and water boats, pipe lines, pontoons, etc. The bucket dredges Seely No. 2, and McSpirit No. 3, and dipper dredge Columbia were also working on this contract during this period. The contract was completed June 4, 1917.	the Plank Road Bridge in front of property belonging to the Ford Motor Co. The dredged material was dumped in front of the pumps and thence pumped ashore for fill. In connection with this work dredging was done for the Ford Motor Co., and material from other dredges was taken care of. [2] Hydraulic dredge, hull 185 by 32 feet; draft 6 feet; 1 centrifugal pump 20 inches, main engines 16 by 22 by 36 inches; 18-inch stroke; 2 swinging engines 18 by 12 inches; 2 cutter engines 12 by 12 inches; 2 tube boilers 12 by 16 feet, carrying 125 pounds steam. Attendant plant—1 dipper dredge, 4 dump scows, 2 water boats, 1 coal boat, 1 tugboat, pontoons, pipe lines, appurtenances, etc. The amount available for expenditure on Dec. 31, 1917, was $19,985.60. 49,964 cubic yards remained to be removed under this contract on Dec. 31, 1917.

TABLE 10.—*Contract dredging by hydraulic dredges during the calendar year ending Dec. 31, 1917*—Continued.

1. District.	Norfolk, Va.			San Francisco (first district).	Wilmington, Del.
2. Name of dredge.	Cape May.	Seminole.	No. 15.	John McMullen.	No. 5, Rickards Dredging Co.
3. Location of dredging.	North River, N. C., and North Landing River, Va., Inland Waterway.	North River, N. C., and North Landing River, Va., Inland Waterway.	Virginia Cut, and North Landing River, Inland, Waterway.	Oakland Harbor.	Inland Waterway between Rehoboth and Delaware Bays.
4. Average depth of water.	9 feet.	9 feet.	9 feet.	15.6 feet.	6 feet.
5. Name of contractor.	Atlantic, Gulf & Pacific Co.	Atlantic, Gulf & Pacific Co.	Atlantic, Gulf & Pacific Co.	San Francisco Bridge Co.	The Rickards Dredging Co.
6. Date of award of contract.	Dec. 11, 1916.	Dec. 11, 1916.	Dec. 11, 1916.	Jan. 20, 1917.	Jan. 13, 1917.
7. Percentage of completion.	76.79.	76 79.	76, 79.	83.1.	93.
8. Probable date of completion of contract.	Oct. 14, 1918.	Oct. 14, 1918.	Oct. 14, 1918.	Mar. 12, 1918.	Time limit waived.
9. Total amount of contract.	$720,000.	$720,000.	$720,000.	$82,880.	$44,000.
10. Cost per cubic yard.	$0.1475.	$0.1475.	$0.1475.	$0.074.	22 cents, place measurement.
11. Total number of yards to be removed under this contract.	5,255,000.	5,255,000.	5,255,000.	1,120,000.	200,000.
12. Total number of cubic yards removed during the calendar year.	3,839,324.	3,839,324.	3,839,324.	945,368.	184,999.
13. Amount paid to contractor during calendar year.	$522,507.74.	$522,507.74.	$522,507.74.	$69,957.23.	$34,251.02.[1]
14. Linear feet of bulkheads constructed during year.	2,400 feet.	7,600 feet.	21,500 feet.	None.	None.
15. Average length of pipe line.	1,000 feet.	800 feet.	1,000 feet.	1,950 feet.	500 feet.
16. Diameter of pipe line.	20 inches.	18 inches.	20 inches.	22 inches.	18 inches.
17. Average number of yards pumped per month.	273,283 cubic yards.	146,543 cubic yards.	66,571 cubic yards.	99,512.	19,472.
18. Character of material.	Mud, clay, and sand.	Mud, clay, and sand.	Mud, sand, and clay.	Soft black sand, stiff blue, yellow and brown sandy clay.	Mud, sand, clay, shells, stones, and gravel.
19. Brief description of dredge and attendant plant.					([2]).
	Remarks. Material still to be removed under this contract, Jan. 1, 1918, 2,084,321 cubic yards. Amount available for expenditure under the con-	*Remarks.* Material still to be removed under this contract, Jan. 1, 1918, 2,084,321 cubic yards. Amount available for expenditure under this con-	*Remarks.* Material still to be removed under this contract, Jan. 1, 1918, 2,084,321 cubic yards. Amount available for expenditure under this con-	*Remarks.* Cubic yards still to be removed, 174,632. 373,801 cubic yards hard material, at $0.074, cost.. $27,661.27	*Remarks.* Estimated quantity of material still to be removed at end of calendar year 1917 about 15,000 cubic yards; amount available for expenditure about $5,500.

tract, Jan. 1, 1918, $130,835.19. Dredge Cape May started dredging operations on a North River, N. C., section of the Inland Waterway on Mar. 26, 1917, and completed that section on June 14, 1917, removing a total of 1,066,365 cubic yards. The Cape May then moved to a North Landing River, Va., section of the Inland Waterway on June 21, 1917, suspending operations before completing section on Aug. 13, 1917, when 163,409 cubic yards were removed. The contract cost per cubic yard was $0.1475. No other work was done by this dredge.	tract, Jan. 1, 1918, $130,835.19. Dredge Seminole started dredging operations on a North River, N. C., section of the Inland Waterway on Jan. 15, 1917, and completed that section on June 4, 1917, removing a total of 858,847 cubic yards. The Seminole then moved to a North Landing River, Va., section of the Inland Waterway, starting operations there on June 11, 1917. This section was completed on Sept. 10, 1917, a total of 279,302 cubic yards having been removed. The contract cost per cubic yard was $0.1475. No other work was done by this dredge.	tract, Jan. 1, 1918, $130,835.19. Dredge No. 15 started dredging operations on the Virginia Cut section of the Inland Waterway on Jan. 11, 1917, and completed this section on July 24, 1917, removing a total of 505,353 cubic yards. No. 15 then moved to a North Landing River, Va., section of the Inland Waterway, starting operations there on July 27, 1917. On Dec. 31, a total of 277,968 cubic yards had been removed by dredge No. 15 on this section. The contract cost per cubic yard was $0.1475.	571,567 cubic yards mud and soft black sand, $0.074, cost..	42,295.96	Bucket dredge Asia was also used on this contract for banking. [1] Excludes payment for yardage removed during December, 1917, which was paid in January, 1918. [2] Hull 90 by 32 by 9 feet; draft 5¼ feet; engine, vertical compound 15 by 18 inches, 180 revolutions per minute; pump 15-inch; fans 6 feet 6 inches, directly connected; coal consumption ¾ ton per hour; necessary pipe, pontoons, coal scows, and gasoline tender.
			945,368 cubic yards, at $0.074	69,957.23	
			Hydraulic dredge, 35 by 120 feet, 14 feet depth hold; 900 horsepower turbine engine and 22-inch centrifugal pump; water-tube boilers; 1,500 feet floating pipe line; 1 pile driver outfit; 22-inch relay pump run by electricity from power line.		

TABLE 11.

CONTRACT DREDGING BY DIPPER DREDGES.

TABLE 11.—*Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1917.*

District	Buffalo, N. Y.			Cincinnati (First district).	
1. Location of dredging	Black Rock Canal	Outer harbor and north entrance, Buffalo, N. Y.	West side entrance channel, Dunkirk, N. Y.	Falling Run Bar	At Ohio River, Dams 16 and 20.
2. Average depth of water	21 feet low-water datum, 570.8 A. T.	21 and 23 feet low-water datum, 570.8 A. T.	16 feet, low-water datum, 570.8 A. T.	4 feet at low water	Variable depth, from 4 to 10 feet, owing to bear-trap maneuvers.
3. Name of contractor	H. S. Kerbaugh (Inc.)	Oliver E. Dunbar	Oliver E. Dunbar, Detroit, Mich.	Western River Co.	Fieger Dredging Co.
4. Name of dredge	Peconic	Hercules and Gladiator	Tipperary Boy	Western	Northern No. 1.
5. Date of award of contract	May 31, 1916	July 1, 1913	Sept. 15, 1916	July 31, 1917	Sept. 10, 1917.
6. Percentage of completion	100	98	56	100	100.
7. Probable date of completion of contract.	July 17, 1917	June 30, 1918	Aug. 15, 1918	Nov. 28, 1917	Completed Dec. 13, 1918.
8. Total amount of contract	$9,780.91	$494,165	$50,258	$8,375	$5,932.50.
9. Cost per cubic yard	24½ cents	Earth 12 cents, scow measure; bedrock, $5, place measure.	Earth, 48 cents; bedrock, $1.31; earth, 7,000, place measurement.	$2.28 per cubic yard, place measurement.	38.3 cents.
10. Total number of cubic yards to be removed under this contract.	34,000	Earth, 809,000; bedrock, 72,000.	Bedrock, 35,000, place measurement.	4,392, place measurement	15,480.
11. Total number of cubic yards removed during the calendar year.	500	None; leveling shoal spots	Earth, 843; bedrock, 18,035	4,392	15,480.
12. Amount paid to contractor during the calendar year.	$285.30 (amount earned)	No payment for dredging	$24,030.49 (amount earned)	$8,375	$5,932.50.
13. Average number of cubic yards removed per monrh.	500	None	Earth, 400; rock, 4,000	1,464	
14. Character of material	Earth and bowlders	Clay and bedrock, limestone	Earth and bedrock	Hard shale rock	Loose stone, sand, and gravel.
15. Average distance from work to dump.	6½ miles	No material dumped	2½ miles	2,000 feet	0.9 mile.
16. Size of dipper and make	4½ cubic yards	5 cubic yards	3 cubic yards	2¾ cubic yards; built up dipper of contractor's own design.	2½ yards; contractor's own design.
17. Brief description of dredge and attendant plant.	See remarks	See below	See remarks	Triple hoist chain dredge; engines 12 by 18 inches.	Wood hull dredge; towboat Lyda and 2 scows.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*	*Remarks.*
	Dredge Peconic, wood hull, 96 feet 5 inches by 35 feet by 9 feet; Allis-Chalmers main engine, double, 12 by 12 inches; Allis-Chalmers	Dredge Hercules, wood hull, 110 by 40 feet; Bucyrus main engine, double, 16 by 18 inches; swinging engine, double; 2 bow spud engines,	Dredge Tipperary Boy, steel hull, 100 by 32 by 8 feet; main engine, double, 12 by 14 inches, made by the Toledo Foundry & Machine	Dredge hired by the day, at $125 per day. Tender was the gasoline boat June Bug, at $20 per day.	Began work at Dam No. 16 on Oct. 15 and finished there Nov. 13, excavating 4,135 cubic yards of material. Plant then moved to

swinging engine, double, 7½ by 8 inches; 2 bow spuds operated by main engine; 1 stern spud operated by main engine; Ames locomotive type boiler, 78 inches by 19 feet 3 inches. Tug Sodus, dump scows B-1 steel, 550 cubic yards; B-2 steel, 550 cubic yards.	double; 1 stern spud engine, double; backing engines, double, spuds 35 by 35 inches; tubular marine boiler. Dredge Gladiator, wood hull, 110 by 38 by 12 feet; Bucyrus main engine, double, 16 by 18 inches; swinging engine, double; bow spuds operated by main engine; stern spud engine, double; spuds 35 by 35 inches; tubular marine boiler. Derricks No. 3 and No. 7, tugs Columbia and Sydney T. Smith.	Co.; swinging engine, double: 2 bow spuds operated by main engine; 1 stern spud engine, double; Scotch tubular marine boiler. Tug Shaughraun; 3 dump scows, Reciprocity, 590 cubic yards; Protective Policy, 365 cubic yards; No. 9, 525 cubic yards. Drill boat Earthquake used, operating costs included in above contract price.	Work was excavating hard shale rock without blasting. Low water greatly retarded work.	Dam No. 20 and worked there until Dec. 10, excavating 11,345 cubic yards of material. Price of dredging plant was $150 per day, which was modified to be $150 per day for active time and $60 per day for inactive time.

TABLE 11.—*Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	Detroit, Mich.				
1. Location and dredging	Black River at Port Huron, Mich.	Rouge River, Mich.	Tailrace, U. S. power plant, St. Mary's Falls Canal, Mich.	Vidal Shoals, St. Mary's River.	Vidal Shoals, St. Mary's River.
2. Average depth of water	Prior depth 14 feet, resulting depth 17 feet.	Prior depth 18 feet, resulting depth 21 feet.	2 to 10 feet	24 feet	24 feet.
3. Name of contractor	Great Lakes Dredge & Dock Co.	Great Lakes Dredge & Dock Co.	Great Lakes Dredge & Dock Co.	Great Lakes Dredge & Dock Co.	Great Lakes Dredge & Dock Co.
4. Name of dredge	No. 4	No. 4	No. 3	No. 9	Majestic.
5. Date of award of contract	June 14, 1917	Oral agreement	July 1, 1915	Oct. 2, 1917	Sept. 13, 1917.
6. Percentage of completion	100	100	100	100	100.
7. Probable date of completion of contract.	Nov. 7, 1917	Nov. 26, 1917 (completed)	Completed Nov. 21, 1917	Completed	Completed.
8. Total amount of contract	$23,280	$2,059.17	$143,806.50	$33,163.33	$41,886.67.
9. Cost per cubic yard	16 cents	41.2 cents	$1.25 and $0.62½, class A; $3.10 and $1.55, class B.	$0.78 per cubic yard (scow measure).	$0.78 per cubic yard (scow measure.
10. Total number cubic yards to be removed under this contract.	145,500 scow measure	4,998 scow measure	14,439, class A; 44,424, class B; 13,082, class B.	42,330 (loose measure)	53,825 (loose measure).
11. Total number cubic yards removed during the calendar year.	do	do	13,082, class B	42,330	53,825.
12. Amount paid to contractor during the calendar year.	$23,280	$2,059.17	$34,725.14 [1]	$33,163.33	$41,886.67.
13. Average number of cubic yards removed per month.	40,416, scow measure	17,500 per month (rate of work).	3,270 (4 months)	19,200 (loose measure)	18,600 (loose measure).
14. Character of material	Silt, sand, and clay	Clay, sand, and silt	Class A, bowlders and hardpan; class B, Potsdam sandstone in situ.	Rock, bowlders, gravel, and hardpan.	Rock, bowlders, gravel, and hardpan.
15. Average distance from work to dump.	About 2 miles	About 3 miles	Casting over	½ mile	¾ mile.
16. Size of dipper and make	4½ cubic yards; Bucyrus	4½ cubic yards; Bucyrus	3¾-yard; hard digging dipper, Hickler make.	5½ yard dipper, Bucyrus	6-yard dipper, made by Hickler Bros.
17. Brief description of dredge and attendant plant.	Wood, 100 by 28 feet, A-frame, boom dipper dredge.	Wood, 100 by 28 feet, A-frame, boom dipper.	Ordinary dipper dredge, tug, and scow; locomotive and cars on dike.	Dredge; steel hull, 131 by 43 by 14 feet; A-frame, hoisting engines; cylinder 18 by 20 inches, with intermediate shaft geared 21 to 1; 2¼-inch cable; independent swinging and anchor engines. Two deck engines; electric lighted; one 1,000 cubic yard steel scow; one 600	Dredge; steel hull, 135 by 40 by 13 feet; A-frame, hoisting engines; cylinder 16 by 20 inches, with intermediate shaft geared 19 to 1; 2¼-inch cable; independent swinging and anchor engines. One deck engine and 1 steam-driven capstan; electric lighted; one 1,000 cubic yard steel scow, one 630

			cubic yard wooden scow.	cubic yard wooden scow; 1 wooden coal scow, 1 tug, Milwaukee.
Remarks.	*Remarks.*	*Remarks.*	*Remarks.*	*Remarks.*
Attendant plant consisted of 1 tug and 2 dump scows of wood. Capacity of dump scows about 390 cubic yards each.	Attendant plant consisted of 1 tug and 2 dump scows of wood. Capacity of dump scows about 390 cubic yards each.	[1] Final estimate paid in January, 1918. Material (see 14). Total quantities, unit prices and value of contract: 11,163 cubic yards, class A, at $1.25 per cubic yard, $13,953.75; 3,276 cubic yards, class A, at $0.62½ per cubic yard, $2,047.50; 38,031 cubic yards, class B, at $3.10 per cubic yard, $117,896.10; 6,393 cubic yards, class B, at $1.55 per cubic yard, $9,909.15. Total cost, $143,806.50. Area, 1,440 feet long by 60 feet wide. Character of work: Subaqueous rock drilling and excavating in swift running water. Drill boat No. 44: Costs included in price of excavation.	Plant employed at $40 per working hour. Tug also attending dredge Majestic on same work.	Plant employed at $40 per working hour. Tug, also attending dredge No. 9, on same work.

TABLE 11.—*Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	Grand Rapids, Mich.	Jacksonville, Fla.	Memphis, first and second Mississippi River districts.	New London, Conn.	Newport, R. I.
1. Location of dredging	Manistee Harbor, Mich.	Biscayne Bay, Fla.	Memphis, Tenn., Harbor.	Connecticut River below Hartford, Conn.	Providence River and Harbor, R. I.
2. Average depth of water	21 feet	Before, 9; after, 20 feet	4 feet	10 feet	25 feet.
3. Name of contractor	Greiling Bros. Co.	Bowers Southern Dredging Co.	Fleger Dredging Co., Pittsburgh, Pa.	The Hartford & New York Transportation Co.	J. S. Packard Dredging Co., Providence, R. I.
4. Name of dredge	Greiling Bros. Dredge No. 3.	Governor Herrick	Northern No. 2	Ajax	Bristol.
5. Date of award of contract	May 1, 1916	Sept. 26, 1916	Sept. 7, 1917	Apr. 5, 1917	Nov. 4, 1916.
6. Percentage of completion	About 90	67.4	100	100	26.53.
7. Probable date of completion of contract.	Some time during calendar year 1918.	October, 1918			June 1, 1919.
8. Total amount of contract	$9,975	$165,124.56	$12,083.96 [1]	$10,168.04	$285,925.
9. Cost per cubic yard	17½ cents	Rock, 68 cents per cubic yard; sand, 20 cents per cubic yard.	$0.163	17.5 cents	Subdivision A, 11 cents; B, 22½ cents; bowlders exceeding 1½ cubic yards each, $8 per cubic yard.
10. Total number of cubic yards to be removed under this contract.	About 59,000	Rock, 181,010 cubic yards; sand, 144,275 cubic yards.	74,110	58,041	2,224,000.
11. Total number of cubic yards removed during the calendar year.	20,773	Rock, 172,846 cubic yards; sand, 39,586 cubic yards.	74,110 [2]	do	45,583 cubic yards mud, 20 cubic yards bowlders.
12. Amount paid to contractor during the calendar year.	$3,306.95. Costs for inspection deducted.	$109,147.54	$12,083.96	$9,336.06	$6,580.26.
13. Average number of cubic yards removed per month.	3,462	Rock, 17,800; sand, 3,900	18,527	15,687	25,899.
14. Character of material	Sand and clay	Sand and rock	Mud and sand	Sand	Mud, sand, shells, gravel, clay, bowlders.
15. Average distance from work to dump.	2 miles	4,000 feet	½ mile	1 mile	15½ miles for 7,258 yards; 1 mile for 38,305 yards.
16. Size of dipper and make	2½ cubic yards; make not known.	10 cubic yards; American Locomotive Works.	2½ cubic yards; Bucyrus Co.	1.9, Osgood	5½ and 7½ yards, contractor's design.
17. Brief description of dredge and attendant plant.	2½ cubic yards; dipper dredge, 2 dump scows, and 1 tug.	(1)	(2)	1 dredge (scoop), 1 tug, 2 dump scows, 1 coal scow.	Crane type, wood hull held by; contractor's design and build; scows and tugs.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*	*Remarks.*
	Number of cubic yards yet to be removed, about 1,200; amount available for expenditure, about $1,000. About	[1] The dredge is a scow model 130 by 53 feet beam over all, 12 feet deep; twin main engines, 17 by 24 inches;	[1] Does not include cost of coal and attendant towboat which was furnished by the United States.	Contract price per cubic yard, 16 cents; contract value of work done, $9,286.56.	Material still to be removed under contract, 1,358,882 cubic yards, at 11 cents; 275,129 cubic yards,

	2,000 cubic yards more than original estimate to be removed.	twin swinging engines, 10 by 14 inches, 2 forward spud engines, 12 by 15 inches; 2 aft spud engines, 8 by 10 inches; twin crowding engines, 11 by 15 inches; 2 Scotch boilers of 225 horsepower each; boiler pressure, 134 pounds; length of boom, 56 feet; dipper handle, 62 feet; engine pull 75,000 increased to 200,000 pounds on dipper bail. The dredge has sufficient quarters for the crew, with lights and refrigerating plant. The contract price per yard includes all expenses incident to removing material.	[2] Includes only yards removed by dipper dredge. [3] Northern No. 2, wood, 90 by 32 feet; hoisting engine, 10½ by 12 inch stroke; separate swinging engines, 7 by 7 inches, double cylinders and friction spud hoist; steel boom and manganese steel bucket. Tender Mercury, sternwheel towboat, 94 feet 6 inches long, 18 feet 4 inches wide, 4 feet deep; engines, high pressure, 8½ inches by 4 feet; boilers, 1 tubular, 44 inches by 16 feet (tender furnished by United States). Dump scows, 2 of 110 cubic yards each.		at 22½ cents; total, 1,634,011 cubic yards. Amount available for expenditure, $291,070.11. Removed from subdivision A, at 11 cents per cubic yard, 33,294 cubic yards, $3,662.34. Removed from subdivision B, at 22½ cents per cubic yard, 12,269 cubic yards, $2,760.53. Bowlders, $8 per cubic yard, 19.674 cubic yards, $157.39.

TABLE 11.—*Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	Newport, R. I.	New York, First District.			
1. Location of dredging	Providence River and Harbor, R. I.	Coenties Reef, East River, N. Y.	Hudson River at Troy, N. Y.	Hudson River, Albany, N. Y.	Hudson River, Troy, N. Y.
2. Average depth of water	25 feet	30 feet	9 feet at lowest low water	10 feet at lowest low water.	9 feet, lowest low water.
3. Name of contractor	J. S. Packard Dredging Co., Providence, R. I.	Great Lakes Dredge & Dock Co.	Great Lakes Dredge & Dock Co.	American Pipe & Construction Co.	Great Lakes Dredge & Dock Co.
4. Name of dredge	Narragansett	Napoleon	No. 52	No. 4	No. 49.
5. Date of award of contract	Nov. 4, 1916	May 22, 1916	Oct. 20, 1913	July 7, 1917	Oct. 20, 1913.
6. Percentage of completion	26.53	70	100	91	100.
7. Probable date of completion of contract.	June 1, 1919	Time limit waived	Completed Dec. 1, 1917	June 1, 1918	Completed Dec. 1, 1917.
8. Total amount of contract	$285,925	$73,678.04[1]	$1,028,871.75	$96,720	$1,028,871.75.
9. Cost per cubic yard	Subdivision A, 11 cents; B, 22½ cents; bowlders exceeding 1½ cubic yards each, $8 per cubic yard.		Soft, $0.4091 and $0.43; rock, $2.40 and $2.90.	$0.312	Soft, $0.4091 and $0.43; rock, $2.40 and $2.90.
10. Total number of cubic yards to be removed under this contract.	2,224,000 cubic yards, scow measurement.	28,555[2]	Rock, 163,500; soft, 1,500,000 (original estimate).	310,000 exclusive of overdepth.	Rock, 163,500; soft, 1,500,000 (original estimate).
11. Total number of cubic yards removed during the calendar year.	39,617 yards mud, etc., 11 yards bowlders.	37,777 cubic yards (scow measurement).	Rock, 14,200; soft, 99,779.5. (No. 52).	30,000 (this plant)	Rock, 342.4; soft, 3,440.2.
12. Amount paid to contractor during the calendar year.	$8,855.63	$37,635.13	$148,713.57 (total)	$83,007.97 (total)	$148,713.57 (total).
13. Average number of cubic yards removed per month.	13,760	4,197.4	30,000	10,000 (this plant)	1,000.
14. Character of material	Mud, sand, shells, gravel, clay, bowlders.	Gneiss	Sand, gravel, cobblestones, and broken rock.	Sand, gravel, and hard pan	Sand, gravel, cobblestones, and broken rock.
15. Average distance from work to dump.	1 mile	7 miles	50 miles.	3 miles	50 miles.
16. Size of dipper and make	3½ yards, contractor's design.	6 cubic yards, Bucyrus Co.	5 cubic yards	4 cubic yards	1½ cubic yards.
17. Brief description of dredge and attendant plant.	Wood hull held by spuds; contractor's design and build, scows and tugs.	Wood, 125 by 40 feet; 3 spuds, 1 hoisting engine, horizontal, cylinder 16 by 18 inches. Attendant plant, drill boat No. 8.	Wooden hull, 40 by 120 feet; 3 tugs, 14 dump scows, and 1 coal scow.	Wooden, 110 by 38 feet by 8.5 inches; draft, 5.5 inches. Engine, 2-cylinder, 16 by 20 inches; boiler, Scotch marine, 9 by 14.	Wooden hull, 70 by 20 by 6 feet; 3 spuds, 3 tugs, 14 dump scows, 1 coal scow.
	Remarks.	*Remarks.*	*Remarks.*	*Remarks.*	*Remarks.*
	Material still to be removed under contract: 1,358,882 cubic yards, at 11 cents; 275,129 cubic yards, at	[1] Total amount of contract for removal to a depth of 40 feet below mean low water, $196,900, of which the United	Under contract with the Great Lakes Dredge & Dock Co. for dredging and rock removal in the Hudson	Under contract with American Pipe & Construction Co. there were removed 291,692.2 cubic	This plant was used in removing isolated points. Under contract with the Great Lakes Dredge &

22½ cents; total, 1,634,011 cuyards. Amount available for expenditure, $291,070.11. Removed from subdivision A, at 11 cents per cubic yard, 1,589 cubic yards, $174.79; removed from subdivision B, at 22½ cents per cubic yard, 38,028 cubic yards, $8,556.30; bowlders, at $8 per cubic yard, 10,568 cubic yards, $84.54.	States is to pay the sum of $73,678.04 for the removal to a depth of 35 feet; and the city of New York is to pay $123,221.96 for the removal between the planes of 35 feet and 40 feet. [3] Amount to be removed under the United States share of the contract.	River, 68,129.5 cubic yards of rock, at $2.40 per cubic yard; 31,137 cubic yards of rock, at $2.90 per cubic yard; 177.6 cubic yards of bowlders, at $2.90 per cubic yard; 386,222.9 cubic yards of soft material, at $0.43 per cubic yard; and 1,162,702.9 cubic yards of soft material, at $0.4091 per cubic yard, at a total contract value of $896,060.74, were removed. The cost of operating the drill boats was included in the contract price. Bucket dredges Nos. 43 and 47, drill boats Nos. 3 and 4, and dipper dredge No. 49 were also engaged on this contract.	yards of material, at $0.312 per cubic yard, at a contract value of $91,007.97. There remains to be removed under this contract approximately 30,000 cubic yards. The amount available for expenditure under this contract is approximately $64,000. This plant was chiefly employed in the removal of shoal and isolated areas. Attendant plant, 1 small tug, coal scow, and 3 dump scows.	Dock Co. for dredging and rock removal in the Hudson River, 68,129.5 cubic yards of rock, at $2.40 per cubic yard; 31,137 cubic yards of rock, at $2.90 per cubic yard; 177.6 cubic yards of bowlders, at $2.90 per cubic yard; 386,222.9 cubic yards of soft material, at $0.43 per cubic yard; and 1,162,702.9 cubic yards of soft material, at $0.4091 per cubic yard, at a total contract value of $896,060.74, were removed. The cost of operating the drill boats was included in the contract price. Dipper dredge No. 52 bucket dredges Nos. 43 and 47, and drill boats Nos. 3 and 4 were also engaged on this contract.

TABLE 11.—*Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	New York, First District.			New York, Third District.	
1. Location of dredging	Hudson River, Troy, N. Y.	Hudson River, Troy, N. Y.	Hudson River, Troy, N. Y.	Passaic River, between Jackson and Bridge Streets, Newark, N. J.	Passaic River, N. J., and Newark Bay, from deep water in bay to about 2,000 feet above the Plank Road Bridge.
2. Average depth of water	9 feet, lowest low water	9 feet, lowest low water	9 feet, lowest low water	12 to 16 feet, dredged 17 feet mean low water.	15 to 21 feet, dredged to 21 feet mean low water.
3. Name of contractor	James Stewart & Co. (Inc.).	James Stewart & Co. (Inc.).	James Stewart & Co. (Inc.).	Great Lakes Dredge & Dock Co.	L. T. Gaylord.
4. Name of dredge	Storm	Blizzard	Hurricane	No. 52	Columbia.
5. Date of award of contract	Mar. 17, 1917	Mar. 17, 1917	Mar. 17, 1917	Apr. 11, 1917	Mar. 27, 1916.
6. Percentage of completion	23	23	23	76	100.
7. Probable date of completion of contract.	Oct. 1, 1919	Oct. 1, 1919	Oct. 1, 1919	Nov. 18, 1917; time limit waived.	Completed June 4, 1917.
8. Total amount of contract	$358,600	$358,600	$358,600	$84,800	$119,700.
9. Cost per cubic yard	Rock, $2.64; soft material, $0.55.	Rock, $2.64; soft material, $0.55.	Rock, $2.64; soft material, $0.55.	40 cents per cubic yard (scow measurement).	13.3 cents per cubic yard (scow measurement).
10. Total number of cubic yards to be removed under this contract.	Rock, 90,000; soft material, 220,000.	Rock, 90,000; soft material, 220,000.	Rock, 90,000; soft material, 220,000.	212,000 cubic yards	985,410 cubic yards removed.
11. Total number of cubic yards removed during the calendar year.		4,516.7 rock; 19,906 soft material (this plant).	3,917 rock; 45,530 soft material (this plant).	162,036 cubic yards	266,355 cubic yards removed under the contract; 6,594 cubic yards removed by this dredge.
12. Amount paid to contractor during the calendar year.	$52,429.34 (total)	$52,429.34 (total)	$52,429.34 (total)	$53,975.33	$46,366.23.
13. Average number of cubic yards removed per month.		8,000 (this plant)	12,000 (this plant)	44,192 cubic yards	For this dredge, 2,909 cubic yards.
14. Character of material	Sand, gravel, and broken rock.	Sand, gravel, and broken rock.	Sand, gravel, and broken rock.	Mud, sand, clay, silt, and small stones.	Mud, sand, and clay.
15. Average distance from work to dump.		20 miles	20 miles	About 3¼ miles	About 3 miles.
16. Size of dipper and make	2½ cubic yards	3½ cubic yards	3½ cubic yards	Dipper bucket, 4½ yards capacity.	Dipper bucket, 4½ cubic yards capacity.
17. Brief description of dredge and attendant plant.	Wooden hull, 107 by 36 by 7.8 feet; two 12 by 16 inch engines; 3 spuds; 1 tug.	Wooden hull, 105 by 40 by 9.5 feet; two 14 by 16 inch engines; 1 Scotch boiler; 4 tug boats; coal scow; and 12 dump scows.	Wooden hull, 105 by 40 by 9.5 feet; two 14 by 16 inch engines; 1 Scotch boiler; 4 tugs; coal scow; and 12 dump scows.	Dipper dredge No. 52, wooden hull, 120 by 40 feet; depth, 12 feet; draft, 6 feet; main engines, two, 18 by 21 inches; water tube boiler; Dutch oven, 125-pounds pressure; attendant plant, 1 hydraulic	Dipper dredge; wooden hull, 93 by 33 feet; draft, 8 feet; main engine, 12 by 20 inches; attended by tug boats, water and coal scows, several mud scows, launches, etc. The hydraulic dredge Washington and the

Remarks.

Under contract with James Stewart & Co. (Inc.), there were removed 8,433.7 cubic yards of rock, at $2.64 per cubic yard, and 65,436.1 cubic yards of soft material, at $0.55 per cubic yard, at a total contract value of $58,254.82. There remains to be removed under this contract approximately 80,000 cubic yards of rock and 155,000 cubic yards of soft material. The amount available for expenditure under this contract is approximately $580,000.

Drill boats engaged on this work were Nos. 62 and 63, and their cost of operation is included in the contract price.

Work under this contract was suspended Oct. 12, 1917, due to the inability of the contractor to obtain a sufficient coal supply.

This plant was engaged in rehandling material at the disposal ground.

Remarks.

Under contract with James Stewart & Co. (Inc.), there were removed 8,433.7 cubic yards of rock, at $2.64 per cubic yard, and 65,436.1 cubic yards of soft material, at $0.55 per cubic yard, at a total contract value of $58,254.82. There remains to be removed under this contract approximately 80,000 cubic yards of rock and 155,000 cubic yards of soft material. The amount available for expenditure under this contract is approximately $580,000.

Drill boats engaged in this work were Nos. 62 and 63, and their cost of operation is included in the contract price.

Work under this contract was suspended Oct. 12, 1917, due to the inability of the contractor to obtain a sufficient coal supply.

Remarks.

Under contract with James Stewart & Co. (Inc.), there were removed 8,433.7 cubic yards of rock, at $2.64 per cubic yard, and 65,436.1 cubic yards of soft material, at $0.55 per cubic yard, at a total contract value of $58,254.82. There remains to be removed under this contract approximately 80,000 cubic yards of rock and 155,000 cubic yards of soft material. The amount available for expenditure under this contract is approximately $580,000.

Drill boats engaged in this work were Nos. 62 and 63, and their cost of operation is included in the contract price.

Work under this contract was suspended Oct. 12, 1917, due to the inability of the contractor to obtain a sufficient coal supply.

dredge (Massachusetts worked on contract to dispose of material), 1 tug boat, 4 dump scows, 2 water boats, 1 coal boat, pontoons, pipe lines and appurtenances.

Remarks.

49,964 cubic yards remained to be removed under the contract on Dec. 31, 1917.

The amount available for expenditure on Dec. 31, 1917, was $19,985.60.

bucket dredges McSpirit No. 3 and Seely No. 2 were also working on this contract during this period. The contract was completed on June 4, 1917.

TABLE 11.—*Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	New York, Third District.			Seattle, Wash.
1. Location of dredging	Shoal Harbor and Compton Creek, N. J.	Staten Island Sound, N. Y. and N. J., vicinity of Carteret.	Staten Island Sound, N. Y. and N. J., rock areas in the vicinity of Shooters Island and between the B. & O. bridge to 1,800 feet below Buckwheat Island.	Salmon Bay, Seattle, Wash.
2. Average depth of water	2 to 5 feet, dredged to 5 and 6 feet mean low water.	24.5 feet before dredging; 26.5 feet after dredging.	22.3 feet before dredging; 25.6 feet after dredging, mean low water.	8 feet to 15 feet at extreme low water.
3. Name of contractor	George Field	P. Sanford Ross (Inc.)	Eugene Breymann	The Erickson Construction Co.
4. Name of dredge	Capital City	No. 16	Toledo	Erickson No. 1.
5. Date of award of contract	July 30, 1917	May 15, 1916	Apr. 5, 1916	Oct. 25, 1916.
6. Percentage of completion	0	36.3	80	Completed.
7. Probable date of completion of contract.	Completed Sept. 4, 1917	Oct. 22, 1918	Original date fixed for completion Nov. 24, 1917, extended for a reasonable period (E. D. 97925/29).	
8. Total amount of contract	Paid contractor $11,157.30	$280,125	$79,600	$109,825.
9. Cost per cubic yard	70 cents per cubic yard (scow measurement).	12.45 cents per cubic yard (scow measurement).	49¾ cents per cubic yard (place measurement).	19.1 cents.
10. Total number of cubic yards to be removed under this contract.	Removed and accepted 15,939 cubic yards.	2,250,000 cubic yards (scow measurement).	160,000 cubic yards (place measurement).	575,000.
11. Total number of cubic yards removed during the calendar year.	do	725,108 cubic yards; no record of this dredge kept (see 13).	37,005 cubic yards (place measurement).	506,134, plus 82,099 yards overdepth.
12. Amount paid to contractor during the calendar year.	$11,157.30 plus cost of means furnished inspectors.	$77,171.43	$18,762.28	$93,263.09.
13. Average number of cubic yards removed per month.	18,380 cubic yards	No record (worked only 12 days picking up shoals. Material dumped in front of hydraulic dredge No. 17).	24,666 cubic yards	42,178 plus 20,525 overdepth for July, August, September, October and November.
14. Character of material	Sand and mud	Sand, gravel, and bowlders	Mud, clay, red shale and trap rock.	Silt, sand, clay, and hardpan.
15. Average distance from work to dump	About 1 mile	½ mile	About 35 miles	1 mile.
16. Size of dipper and make	Dipper 2½ cubic yards capacity	Dipper bucket, capacity 4 cubic yards.	Dipper 15 cubic yards capacity	42 by 48 by 48 inches, Marion, Ohio, Pat. June 11, 1903.
17. Brief description of dredge and attendant plant.	Dipper dredge, wooden hull 67 by 31.4 feet; draft 6 feet; 1 water boat, 1 tug boat, 4 dump scows.	Dipper dredge, hull 85 by 34 feet; draft 7 feet; bucket 4 cubic yard; engines 14 by 16 inches. The hydraulic dredge No. 17 worked on this contract during the period. They were attended by a tug, gasoline launch, coal and water boat, pontoons, etc.	Dipper dredge, hull 135 by 44 feet, draft 16 feet; bucket 15 cubic yard, engines 18 by 24 by 28 inches, 2 tug boats, 6 dump scows, 1 coal and water boat.	Two 40-horsepower boilers, oil scow, tug and two 200 cubic yard barges.

Remarks.	*Remarks.*	*Remarks.*	*Remarks.*
Contract completed Sept. 4, 1917. Material disposed of by dumping on flats to the eastward of ruins of old piers of New Jersey Southern Railroad.	1,432,590 cubic yards, scow measurement, remain to be removed. 817,410 cubic yards scow measurement, have been removed at a total cost of $91,509.85 exclusive of retained percentage, inspection, and overhead cost. Amount available $178,357.44. No drill boat used.	The drill boat Racker Rock was also employed on this contract during 6 months of the year, working in this rock area southeast of Shooters Island. The cost of operation is included in the contract price. 31,907 cubic yards remain to be removed. Amount available, $178,357.44. The contract price per yard is 49¾ cents per cubic yard. 128,093 cubic yards have been removed.	Contract was completed Jan. 23, 1918. Total yardage removed was 521,859 cubic yards, plus 87,092 cubic yards overdepth. Total paid contractor was $107,561.29. Price per cubic yard overdepth, $0.0955.

TABLE 12.

BUCKET DREDGES BY CONTRACT.

TABLE 12.—*Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1917.*

District	Baltimore, Md.	Honolulu, Hawaii.		New London, Conn.	
1. Location of dredging	Susquehanna River, Md.	Honolulu, Hawaii	Honolulu, Hawaii	Harbor of Refuge, Duck Island Harbor, Conn.	New Haven Harbor, Conn.
2. Average depth of water	15 feet.	20 feet.	2 feet.	9 feet.	9½ and 10 feet.
3. Name of contractor	Dorsey & Miller Co.	Hawaiian Dredging Co. (Ltd.).	Hawaiian Dredging Co. (Ltd.).	J. S. Packard Dredging Co.	Boston Dredging Co.
4. Name of dredge	Dixon	California	Dennison	Delver	Freeport.
5. Date of award of contract	Aug. 3, 1916	May 23, 1917	Oct. 29, 1917	Oct. 5, 1916	Oct. 28, 1916.
6. Percentage of completion	100	95	4	100	100.
7. Probable date of completion of contract.	Completed	Feb. 5, 1918	June 28, 1918		
8. Total amount of contract	$13,489.90	$50,000	$100,000 cubic yards	$60,125.16	$17,032.73.
9. Cost per cubic yard	16½ cents	29 cents, $1.49, $1.99, prices varying according to areas.	65 cents	8.7 cents	19.3 cents.
10. Total number of cubic yards to be removed under this contract.	86,256	76,500 cubic yards	100,000	688,820	88,112.
11. Total number of cubic yards removed during the calendar year.	35,305	72,675	4,000	674,021	88,112.
12. Amount paid to contractor during the calendar year.	$6,847.53	$43,188.02	$2,340	47,010.26	$15,900.05.
13. Average number of cubic yards removed per month.	7,100	5,000	12,000	133,320	18,615.
14. Character of material	Sand, mud, and clay	Coral in various stages of disintegration.	Coral	Mud	Mud and sand.
15. Average distance from work to dump.	2½ miles	1 mile		3 miles	9 miles.
16. Size of bucket and make	3-yard, made by contractor	4½-yard clamshell; Golden State Miners Iron Works, San Francisco.	2½-yard Marion, rebuilt to 4 yards.	8-yard clamshell	5-yard clamshell.
17. Brief description of dredge and attendant plant.	Dredge, coal and water tender, 3 scows, and towboat.	Swinging boom on wooden scow, 120 by 60 by 14 feet; 2 bottom dump scows are used, having a capacity of 400 cubic yards each; local tugs are hired for towing.	Wood hull, 100 by 40 by 8 feet; 1 drill scow.	1 clamshell dredge, 2 tugs, 4 scows, water boat, coal boat, and launch.	1 clamshell dredge, 1 tug, 4 scows.
				Remarks. Contract price, 7.7 cents per cubic yard; contract value of work done, $53,039.14.	*Remarks.* Contract price, 17.9 cents; contract value of work done, $15,772.5.

TABLE 12.—*Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	New London.		Newport, R. I.		New York, First District.
1. Location of dredging	Norwalk Harbor, Conn.	Stamford Harbor, Conn.	Providence River and Harbor, R. I.	Providence River and Harbor, R. I.	Hudson River Channel.
2. Average depth of water	7 feet	5½ to 6½ feet	25 feet	25 feet	25 feet.
3. Name of contractor	Maritime Dredging Co.	Maritime Dredging Co.	J. S. Packard Dredging Co., Providence, R. I.	J. S. Packard Dredging Co., Providence, R. I.	Eugene Breymann.
4. Name of dredge	Syracuse	Syracuse	Delver.	Newport	McMartin.
5. Date of award of contract	Oct. 28, 1916	Oct. 28, 1916	Nov. 4, 1916	Nov. 4, 1916	Dec. 21, 1916.
6. Percentage of completion	100	100	26.53	26.53	1.4.
7. Probable date of completion of contract.			June 1, 1919	June 1, 1919	
8. Total amount of contract	$8,342.16	$9,565.41	$285,925	$285,925	$370,500 (estimated).
9. Cost per cubic yard	23.3 cents	25.4 cents	Subdivision A, 11 cents; B, 22½ cents; bowlders exceeding 1½ cubic yards each, $8 per cubic yard.	Subdivision A, 11 cents; B, 22½ cents; bowlders exceeding 1½ cubic yards each, $8 per cubic yard.	$0.15½ and $0.19½.
10. Total number of cubic yards to be removed under this contract.	47,203	37,618	2,224,000 cubic yards, scow measurement.	2,224,000 cubic yards, scow measurement.	2,085,000 (estimated).
11. Total number of cubic yards removed during the calendar year.	47,203	37,618	495,775 cubic yards mud, etc., 10 cubic yards bowlders.	9,003	34,372.2.
12. Amount paid to contractor during the calendar year.	$7,819.93	8,649.76	$58,474.30	$990.33	$4,460.16.
13. Average number of cubic yards removed per month.	17.7 cents	12.539	107,777	17,313	11,457.4.
14. Character of material	Mud	Mud, sand, and gravel	Mud, sand, shells, gravel, clay, bowlders.	Mud, sand, shells, gravel, clay.	Mud.
15. Average distance from work to dump.	7 miles	3½ miles	15½ miles	15½ miles dumped 3,660 yards; 1 mile dumped 5,343 cubic yards.	35 miles.
16. Size of bucket and make	5-yard clamshell	5-yard, clamshell	7-yard clamshell; contractor's design.	2-yard, clamshell; contractor's design.	36 buckets, 1½ cubic yards.
17. Brief description of dredge and attendant plant.	1 clamshell dredge, 2 tugs, 4 scows.	1 clamshell dredge, 2 tugs, 4 scows.	Wooden hull held by quarter lines and spuds; bottom dump scows and steam tugs.	Wooden hull held by spuds; contractor's design and build; scows and tugs.	Wood, 200 by 38 feet, draft 14 feet 6 inches; 1 propelling engine, cylinder 23 by 42 inches; 1 dredge engine, cylinder 18 by 18 inches.

Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
Contract price per yard, 17 cents; contract value of work done, $8,024.51.	Contract price per yard, 22 cents; contract value of work done, $8,275.96.	Material still to be removed under contract, 1,358,882 cubic yards, at 11 cents, 275,129 cubic yards, at 22½ cents; total, 1,634,011 cubic yards. Amount available for expenditure, $291,070.11 Removed, subdivision A, 11 cents per cubic yard, 462,232 cubic yards, $50,845.52; subdivision B, 22½ cents per cubic yard, 33,533 cubic yards, $7,544.93; bowlders, at $8 per cubic yard, 10,481 cubic yards, $83.85.	Material still to be removed under contract; 1,358,882 cubic yards, at 11 cents; 275,129 cubic yards, at 22½ cents; total, 1,634,011 cubic yards. Amount available for expenditure, $291,070.11 Removed from subdivision A, 9,003 cubic yards, $990.33.	Work under this contract was suspended owing to conditions created by the existing national emergency.

TABLE 12.—*Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	New London.		Newport, R. I.		New York, First District.
1. Location of dredging	Norwalk Harbor, Conn.	Stamford Harbor, Conn.	Providence River and Harbor, R. I.	Providence River and Harbor, R. I.	Hudson River Channel.
2. Average depth of water	7 feet	5½ to 6½ feet	25 feet	25 feet	25 feet.
3. Name of contractor	Maritime Dredging Co.	Maritime Dredging Co.	J. S. Packard Dredging Co., Providence, R. I.	J. S. Packard Dredging Co., Providence, R. I.	Eugene Breymann.
4. Name of dredge	Syracuse	Syracuse	Delver	Newport	McMartin.
5. Date of award of contract	Oct. 28, 1916	Oct. 28, 1916	Nov. 4, 1916	Nov. 4, 1916	Dec. 21, 1916.
6. Percentage of completion	100	100	26.53	26.53	1.4.
7. Probable date of completion of contract.			June 1, 1919	June 1, 1919	
8. Total amount of contract	$8,342.16	$9,565.41	$285,925	$285,925	$370,500 (estimated).
9. Cost per cubic yard	23.3 cents	25.4 cents	Subdivision A, 11 cents; B, 22½ cents; bowlders exceeding 1½ cubic yards each, $8 per cubic yard.	Subdivision A, 11 cents; B, 22½ cents; bowlders exceeding 1½ cubic yards each, $8 per cubic yard.	$0.15½ and $0.19½.
10. Total number of cubic yards to be removed under this contract.	47,203	37,618	2,224,000 cubic yards, scow measurement.	2,224,000 cubic yards, scow measurement.	2,085,000 (estimated).
11. Total number of cubic yards removed during the calendar year.	47,203	37,618	495,775 cubic yards mud, etc., 10 cubic yards bowlders.	9,003	34,372.2.
12. Amount paid to contractor during the calendar year.	$7,819.93	8,649.76	$58,474.30	$990.33	$4,460.16.
13. Average number of cubic yards removed per month.	17.7 cents	12.539	107,777	17,313	11,457.4.
14. Character of material	Mud	Mud, sand, and gravel	Mud, sand, shells, gravel, clay, bowlders.	Mud, sand, shells, gravel, clay.	Mud.
15. Average distance from work to dump.	7 miles	3½ miles	15½ miles	15½ miles dumped 3,660 yards; 1 mile dumped 5,343 cubic yards.	35 miles.
16. Size of bucket and make	5-yard clamshell	5-yard, clamshell	7-yard clamshell; contractor's design.	2-yard, clamshell; contractor's design.	36 buckets, 1½ cubic yards.
17. Brief description of dredge and attendant plant.	1 clamshell dredge, 2 tugs, 4 scows.	1 clamshell dredge, 2 tugs, 4 scows.	Wooden hull held by quarter lines and spuds; bottom dump scows and steam tugs.	Wooden hull held by spuds; contractor's design and build; scows and tugs.	Wood, 200 by 38 feet, draft 14 feet 6 inches; 1 propelling engine, cylinder 23 by 42 inches; 1 dredge engine, cylinder 18 by 18 inches.

Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
Contract price per yard, 17 cents; contract value of work done, $8,024.51.	Contract price per yard, 22 cents; contract value of work done, $8,275.96.	Material still to be removed under contract, 1,358,882 cubic yards, at 11 cents, 275,129 cubic yards, at 22½ cents; total, 1,634,011 cubic yards. Amount available for expenditure, $291,070.11 Removed, subdivision A, 11 cents per cubic yard, 462,232 cubic yards, $50,845.52; subdivision B, 22½ cents per cubic yard, 33,533 cubic yards, $7,544.93; bowlders, at $8 per cubic yard, 10,481 cubic yards, $83.85.	Material still to be removed under contract; 1,358,882 cubic yards, at 11 cents; 275,129 cubic yards, at 22½ cents; total, 1,634,011 cubic yards. Amount available for expenditure, $291,070.11 Removed from subdivision A, 9,003 cubic yards, $990.33.	Work under this contract was suspended owing to conditions created by the existing national emergency.

TABLE 12.—*Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1917*—Continued.

District.	New York, First District.			New York, Third District.	
1. Location of dredging.	Hudson River at Troy, N. Y.	Hudson River at Troy, N. Y.	Hudson River, Troy, N. Y.	Newark Bay and Passaic River, N. J., from deep water in bay to about 2,000 feet above the Plank Road Bridge.	Newark Bay and Passaic River, N. J., from deep water in bay to about 2,000 feet above the Plank Road Bridge.
2. Average depth of water.	9 feet at lowest low water.	9 feet at lowest low water.	9 feet lowest low water.	15 to 21 feet dredged 21 feet at mean low water.	15 to 21 feet dredged 21 feet at mean low water.
3. Name of contractor.	Great Lakes Dredge & Dock Co.	Great Lakes Dredge & Dock Co.	James Stewart & Co. (Inc.).	L. T. Gaylord.	L. T. Gaylord.
4. Name of dredge.	No. 43.	No. 47.	Atlas or No. 72.	McSpirit No. 3.	Seely No. 2.
5. Date of award of contract.	Oct. 20, 1913.	Oct. 20, 1913.	Mar. 17, 1917.	Mar. 27, 1916.	Mar. 27, 1916.
6. Percentage of completion.	100.	100.	23.	100.	100.
7. Probable date of completion of contract.	Completed Dec. 1, 1917.	Completed Dec. 1, 1917.	Oct. 1, 1919.	Completed June 4, 1917.	Completed June 4, 1917.
8. Total amount of contract.	$1,028,871.75.	$1,028,871.75.	$358,600.	$119,700.	$119,700.
9. Cost per cubic yard.	Soft, $0.4091 and $0.43; rock, $2.40 and $2.90.	Soft, $0.4091 and $0.43; rock, $2.40 and $2.90.	Rock, $2.64; soft material, $0.55.	13.3 cents per cubic yard (scow measurement).	13.3 cents per cubic yard (scow measurement).
10. Total number of cubic yards to be removed under this contract.	163,500 rock; 1,500,000 soft (original estimate).	163,500 rock; 1,500,000 soft (original estimate).	Rock, 90,000; soft material, 220,000.	Removed 985,410 cubic yards.	Removed 985,410 cubic yards.
11. Total number of cubic yards removed during the calendar year.	1,434.8 rock; 15,427.3 soft (No. 43).	476.1 rock; 9,919.3 soft (No. 47).	Rock, 8,433.7; soft material 65,436.1.	266,355; this drdege worked entirely removing small shoals and received no estimate for work done.	266,355 cubic yards under contract; 21,264 cubic yards by this dredge.
12. Amount paid to contractor during the calendar year.	$148,713.57 (total).	$148,713.57 (total).	$52,429.34 (total).	$46,366.23.	$46,366.23.
13. Average number of cubic yards removed per month.	2,290.	3,400.		No estimate given this dredge for the period as it was working entirely on cleaning up work. Time worked, 1 month 1 day.	5,186 cubic yards.
14. Character of material.	Sand, gravel, cobblestones, and broken rock.	Sand, gravel, cobblestones, and broken rock.	Sand, gravel, and broken rock.	Mud, sand, and clay.	Mud, sand, and clay.
15. Average distance from work to dump.	50 miles.	50 miles.	20 miles.	3 to 4 miles.	About 2 miles.
16. Size of bucket and make.	2 cubic yards, clamshell.	2 yards, clamshell.	¾ yard, clamshell; Geo. Haiss Manufacturing Co.	Orange-peel bucket, 3 cubic yards capacity.	Clamshell bucket, capacity 5 cubic yards.
17. Brief description of dredge and attendant plant.	Wooden hull, 36 by 101 feet; 3 tugboats, 14 dump scows, and 1 coal scow.	Wooden hull, 86 by 23½ by 8½ feet, 3 tugboats, 14 dump scows, and 1 coal scow.	Wooden hull, 96 by 29 by 7.5 feet.	Bucket dredge, McSpirit No. 3; hull 85 by 25 feet; draft about 5 feet; main engine 10 by 24 inches. Attended by 1 tugboat,	Clamshell dredge, wooden construction; hull wooden, 88 by 34 feet; depth, 8 feet; 2 main engines, 21 by 18 inches; 2 speed en-

Remarks.	Remarks.	Remarks.		
This plant was used exclusively in removing shoals. Under contract with the Great Lakes Dredge & Dock Co. for dredging and rock removal in the Hudson River, 58,129.5 cubic yards of rock, at $2.40 per cubic yard; 31,137 cubic yards of rock, at $2.90 per cubic yard; 177.6 cubic yards of bowlders, at $2.90 per cubic yard; 386,222.9 cubic yards of soft material, at $0.43 per cubic yard; 1,162,702.9 cubic yards of soft material, at $0.4091 per cubic yard, at a total contract value of $896,060.74 were removed. The cost of operating the drill boats is included in the contract price. Dipper dredges Nos. 49 and 52, bucket dredge No. 47, and drill boats Nos. 3 and 4 were also engaged on this contract.	**This plant was used exclusively in removing shoals.** Under contract with the Great Lakes Dredge & Dock Co. for dredging and rock removal in the Hudson River, 58,129.5 cubic yards of rock, at $2.40 per cubic yard; 31,137 cubic yards of rock, at $2.90 per cubic yard; 177.6 cubic yards of bowlders, at $2.90 per cubic yard; 386,222.9 cubic yards of soft material, at $0.43 per cubic yard; 1,162,702 cubic yards of soft material at $0.4091 per cubic yard, at a total contract value of $896,060.74 were removed. The cost of operating the drill boats is included in the contract price. Dipper dredges Nos. 49 and 52, bucket dredge No. 43, and drill boats Nos. 3 and 4 were also engaged on this contract.	**This plant engaged in removing shoals.** Under contract with James Stewart & Co. (Inc.), there were removed 8,433.7 cubic yards of rock, at $2.64 per cubic yard, and 65,436.1 cubic yards of soft material, at $0.55 per cubic yard, at a total contract value of $58,254.82. There remains to be removed under this contract approximately 80,000 cubic yards of rock, and 155,000 cubic yards of soft material. The amount available for expenditure under this contract is approximately $580,000. Drill boats engaged in this work were Nos. 62 and 63, and their cost of operation is included in the contract price. **Work under this contract was suspended Oct. 12, 1917,** due to the inability of the contractor to obtain a sufficient coal supply.	1 coal and water boat, and several dump scows, hydraulic dredge Washington, and dipper dredge Columbia, and bucket dredge Seely No. 2, also working on this contract. This dredge used to dig areas in bridge draws and clean up shoals. No separate estimate credited to this dredge. Contract completed June 4, 1917.	gines, 6 by 8 inches; locomotive boiler 120 pounds pressure. The hydraulic dredge Washington, and bucket dredge McSpirit No. 3, and dipper dredge Columbia also worked on this contract for the period. They were attended by 2 to 3 tugs, coal and water boats, launches, pontoons, etc. The contract was completed June 4, 1917.

TABLE 12.—*Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	Norfolk, Va.		Philadelphia, Pa.		
1. Location of dredging	Southern branch of Elizabeth River, Va.	North River Bar, N. C., Inland Waterway.	Delaware River (below Philadelphia, Pa.).	Delaware River (below Philadelphia, Pa.).	Delaware River (above Philadelphia, Pa.).
2. Average depth of water	18 feet	9 feet	30 feet before dredging; dredged to 35 feet mean low water.	25 feet; dredged to 35 feet mean low water.	10 feet; dredged to 12 feet mean low water.
3. Name of contractor	Coastwise Dredging Co.	Atlantic, Gulf & Pacific Co.	Maryland Dredging & Construction Co., Baltimore, Md.	American Dredging Co., Philadelphia, Pa.	Rickards Dredging Co., Philadelphia, Pa.
4. Name of dredge	No. 3	No. 7	Kennedy and Severn	Admiral, Baltic, Camden, Commodore, Severn.	Arizona.
5. Date of award of contract	Feb. 17, 1917	Dec. 11, 1916	July 29, 1916	Nov. 25, 1916	Nov. 25, 1916.
6. Percentage of completion	100	76 79/100	100	35	100.
7. Probable date of completion of contract.	Aug. 1, 1917	Oct. 14, 1918	Completed June 19, 1917	Dec. 31, 1918	Terminated by supplementary agreement Dec. 15, 1917.
8. Total amount of contract	$12,716	$720,000	$60,881.45	$717,750	$830.08.
9. Cost per cubic yard	$0.1744	$0.1475	16.2 cents	9.9 cents	32 cents.
10. Total number of cubic yards to be removed under this contract.	78,925 cubic yards (scow measurement).	5,255,000	447,172 (net)	7,250,000 (estimate to 35 feet depth).	2,594.
11. Total number of cubic yards removed during the calendar year.	99,479 cubic yards (scow measurement).	3,839,324	Kennedy, 188,977; Severn, 51,492.	3,169,928 gross [1]	2,594.
12. Amount paid to contractor during the calendar year.	$11,056.10	$522,507.74	$38,759.94	$243,261.12	
13. Average number of cubic yards removed per month.	70,986	86,010	Kennedy, 63,000; Severn, 39,000.	(1)	7,500.
14. Character of material	Mud	Sand	Mud, sand, gravel, clay, and cobbles.	Mud and sand	Mud, sand, and gravel.
15. Average distance from work to dump.	15 miles	2 miles	5 miles	1 mile	600 feet.
16. Size of bucket and make	7 cubic yards, clamshell	7 cubic yards, clamshell	See below	(2)	3 cubic yards, clamshell Theo. Smith.
17. Brief description of dredge and attendant plant.			2 dredges, 2 tugs, 4 to 6 scows.	5 grapple dredges, 2 rehandling machines, 1 tug, and 2 to 3 scows each dredge.	1 dredge, 1 tug, 3 scows.

<table>
<tr><th>Remarks.</th><th>Remarks.</th><th>Remarks.</th><th>Remarks.</th><th>Remarks.</th></tr>
<tr>
<td>Settlement of this contract was still pending Dec. 31, 1917, on account of the great discrepancy between the actual yardage of material removed and estimate in the specifications.</td>
<td>Material still to be removed under this contract, Jan. 1, 1918, 2,084,321 cubic yards.
Amount available for expenditure under this contract, Jan, 1, 1918, $130,835.19.
Dredge No. 7 started dredging operation on the North River Bar, N. C., section of the Inland Waterway on Jan. 17, 1917, and completed this section on Sept. 13, 1917, removing a total of 688,080 cubic yards.
The contract cost per cubic yard was $0.1475. No other work was done by this dredge.</td>
<td>Kennedy, bucket ladder dredge, 34 buckets, 21 cubic feet each.
Severn, clamshell, 3½ cubic yards, contractor's design.
All the material dredged during the calendar year was deposited at dumping ground without rehandling.</td>
<td>
<table>
<tr><th>[1] Removed by dredge—</th><th>Cubic yards.</th><th>Average per month, cubic yards.</th></tr>
<tr><td>Admiral</td><td>1,170,489</td><td>150,000</td></tr>
<tr><td>Baltic</td><td>615,590</td><td>94,000</td></tr>
<tr><td>Camden</td><td>521,291</td><td>106,000</td></tr>
<tr><td>Commodore</td><td>690,237</td><td>125,000</td></tr>
<tr><td>Severn</td><td>172,321</td><td>86,000</td></tr>
<tr><td>Total</td><td>3,169,928</td><td>........</td></tr>
</table>
[2] Admiral, clamshell, 10 cubic yards, contractor's design; Baltic, clamshell, 5¼ cubic yards, contractor's design; Camden, clamshell, 7½ cubic yards, contractor's design; Commodore, clamshell, 10 cubic yards, contractor's design; Severn, clamshell, 3½ cubic yards, contractor's design.
</td>
<td>Dredging was in progress Nov. 11 to 22, 1916. The contractor's plant was urgently needed for work in connection with construction of shipyard at Hog Island and as Government plant was available for the work covered by the contract, the withdrawal of the contractor's plant and termination of the contract by supplemental agreement was authorized by the Chief of Engineers, Nov. 21, 1917. All of the material removed was deposited in deep holes opposite the work and not less than 600 feet from the limits of the channel.</td>
</tr>
</table>

TABLE 12.—*Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	Portland, Me.		San Francisco, Cal., First District.	San Francisco, Cal., Third District.				
				Sacramento River.		Mokelumne River.	Mormon Channel.	
				Lower.	Upper.			
1. Location of dredging	Portland Harbor	Portland Harbor	Petaluma Creek					Collins Eddy, upper Sacramento River.
2. Average depth of water	30 feet before dredging; 35 to 37 feet after dredging.	30 feet before dredging, 35 to 37 feet after dredging.	6 feet	(1)	*Feet.* 4.8	*Feet.* 7	*Feet.* 4	
3. Name of contractor	Maryland Dredging & Contracting Co., Baltimore, Md.	Maryland Dredging & Contracting Co., Baltimore, Md.	Marshall C. Harris	Olympian Dredging Co.				Olympian Dredging Co.
4. Name of dredge	Chesapeake	Freeport	Golden Gate	Thor				Ajax.
5. Date of award of contract	Aug. 30, 1917	Aug. 30, 1917	July 2, 1917	Aug. 13, 1917				Sept. 13, 1917.
6. Percentage of completion	19	19	100	60 or 36 (see No. 7)				53.8 or 30.4 (see No. 7).
7. Probable date of completion of contract.	August, 1918	August, 1918	Aug. 10, 1917	Apr. 1, 1918 (with possible 5 months extension).				Apr. 1, 1918 (with possible 5 months extension).
8. Total amount of contract	$197,280.54	$197,280.54	$4,846.80	$30,000				Indeterminate.
9. Cost per cubic yard	15.8 cents	15.8 cents	17½ cents	$8.20 per hour actual work; $6.15 per hour towing, etc.				$8 per hour of actual work; $8 per hour towing and time held idle.
10. Total number of cubic yards to be removed under this contract.	Estimated at 1,248,611 cubic yards (scow measurement).	Estimated at 1,248,611 cubic yards (scow measurement).	27,696	Indeterminate (see No. 9)				Indeterminate.
11. Total number of cubic yards removed during the calendar year.	257,702 cubic yards gross or 237,669 cubic yards net under the contract; 174,310 cubic yards gross or 159,582 cubic yards net by this dredge.	257,702 cubic yards gross or 237,669 cubic yards net under the contract; 83,392 cubic yards gross or 78,087 cubic yards net by this dredge.	27,696	312,500 cubic yards				160,190.
12. Amount paid to contractor during the calendar year.	$27,766.70	$27,766.70	$4,846.80	$16,466.18				$3,744.53.
13. Average number of cubic yards removed per month.	85,901 cubic yards gross; 79,223 cubic yards net under this contract, 58,103 cubic yards gross or 53,194 cubic yards net by this dredge.	85,901 cubic yards gross or 79,223 cubic yards net under the contract, 41,696 cubic yards gross or 39,044 cubic yards net by this dredge (2 months work).	27,696	100,000				85,200.
14. Character of material	Stiff clay	Stiff clay	Sand and marsh mud	Sand and mud				Sandy loam.

15. Average distance from work to dump.	4 miles	4 miles	125 feet	Up to 125 feet	At side of cut (50 feet).
16. Size of bucket and make	6 cubic yards, clamshell	4 cubic yards, clamshell	3 yards	4½ yards water measure, Miners Iron Works, Oakland, Cal.	4¼ yards (special).
17. Brief description of dredge and attendant plant.	(1)	(1)	Clamshell dredge 50 by 100 by 10 feet, water barge 20 by 30 feet, oil barge 20 by 30 feet.	(2)	Clamshell bucket dredge, boom 160 feet long, 250-horsepower engine, oil barge and launch.
	Remarks. [1] Dredge Chesapeake held on wires; hull, wood. Length 100 feet, beam 32 feet, draft 6 feet; main engines 16 by 24 inches double horizontal condensing. Three auxiliary engines; two of which are 8 by 10 inches; and one 8 by 6 inches electric equipment and searchlight; one Scotch boiler, fire tube, 9½ by 11 feet. Allowed pressure 92 pounds. Dredge has spud wells but no spuds. Attendant plant: One tug boat Sarah, chartered gross tonnage 86 tons. Engine 12 by 24 by 20 inch stroke. Four bottom dumping scows of from 600 to 900 cubic yards capacities. One coal and water scow. Estimated number of cubic yards still to be removed under this contract at end of calendar year, 1,010,942. Amount available for expenditure, $302,344.20. Contract value of work done, $37,551.70. Dredge Freeport also worked on this contract.	*Remarks.* [1] Dredge Freeport held on wires; no spuds; hull, wood, length 110 feet; beam 36.5 feet; draft 5½ feet; main engines, 16 by 24 inches horizontal; four auxiliary engines, two of which are 8 by 8 inches and two 10 by 12 inches; electric equipment; one locomotive return tube boiler 7 by 14 feet; allowed pressure, 125 pounds. Attendant plant: One tug boat Dresden, gross tonnage 99. Engines 18 by 24 inches, single cylinder, surface condensing. Three bottom dumping scows of from 600 to 700 cubic yards capacities. One coal and water scow, one lighter. Dredge Freeport and attendant plant owned by Boston Dredging Co., Boston, Mass. Estimated number of cubic yards still to be removed under this contract at end of calendar year, 1,010,942. Amount available for expenditure, $302,344.20. Contract value of work done, $37,551.70. Dredge Chesapeake also worked on this contract.	*Remarks.* This was all redredging over a large area of varying depth and in a narrow channel whose traffic interfered with the work.	*Remarks.* [1] —6 feet before dredging; 8 feet after dredging. [2] Clamshell dredge, length 120 feet, width 56 feet, depth 10 feet, draft 6 feet, 160-foot boom, 250-horsepower engine, Joshua Hendy Iron Works, maker, Scotch marine boiler, 250-horsepower, 9 bed rooms, bath, toilet, and kitchen, with attendant gasoline launch 36 feet long, 9-foot beam, 60-horsepower.	

TABLE 12.—*Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	San Francisco, Cal. (Third District).				Washington, D. C.
1. Location of dredging	Collins Eddy Cut, Sacramento River.	Lower Sacramento River, Cal.	Sacramento River, Vernon to Sacramento.	Lower Sacramento River, Cal.	Anacostia River, D. C.
2. Average depth of water		4 feet before dredging; 9 feet after dredging.	4 to 5 feet	Indeterminate	1 foot.
3. Name of contractor	Olympian Dredging Co.	Olympian Dredging Co.	Olympian Dredging Co.	The Western Co.	Dorsey & Miller Co.
4. Name of dredge	Mars	Trojan	Trojan	Tule King	Daniel.
5. Date of award of contract	Sept. 13, 1917	Sept. 13, 1917	No contract	Aug. 4, 1916	Apr. 13 and June 5, 1916 (2 public notice orders).
6. Percentage of completion	53.8 or 30.4 (see No. 7)	53.8 or 30.4 (see No. 7)	100	100	Completed.
7. Probable date of completion of contract.	Apr. 1, 1918 (with possible 5 months extension).	Apr. 1, 1918 (with possible 5 months extension).	Aug. 20, 1917 (completed)	Completed	
8. Total amount of contract	Indeterminate	Indeterminate	$73.20	$28,669.71	$4,287.29.
9. Cost per cubic yard	$12 per hour actual work; $9.50 per hour towing, etc.	$10 per hour actual work; $7.50 per hour towing, etc.	15 cents	$6 per hour for dredging; $5 per hour for towing, etc.	Unit cost, $4.15 per hour's work.
10. Total number of cubic yards to be removed under this contract.	Indeterminate	Indeterminate (see No. 9)	488	About8 10,000 removed.	73,748 (under 2 orders above).
11. Total number of cubic yards removed during the fiscal year.	67,725	116,000	488	About 510,000	7,782.
12. Amount paid to contractor during the fiscal year.	$3,762.20	Nothing	$73.20	$17,695.23	$517.71.
13. Average number of cubic yards removed per month.	At the rate of $135,000	125,000	488 (total)	102,640	8,000.
14. Character of material	River silt and loam	Peat, with small percentage of clay and mud.	Sand	Sand and peat	Mud.
15. Average distance from work to dump.	At side of cut	Adjacent	At side of cut	On embankment at side of cut.	Embankment work.
16. Size of bucket and make	6¼ cubic yards, water measure.	5½ cubic yards, water measure, made by Olympian Dredging Co.	5½ cubic yards	4½ yards, Trethaway, Stockton, Cal.	1½ cubic yards, clamshell.
17. Brief description of dredge and attendant plant.	Clamshell bucket dredge; 229-foot boom; 300 horsepower engines; oil barge and launch.	Clamshell dredge; length, 140 feet; width, 66 feet; depth, 12 feet; draft level, 5 feet; draft when tipped, 9 feet; length of boom, 205 feet; clear reach, 145 feet; horsepower main engines, 300; horsepower lanuch, 45.	Clamshell bucket dredge; 205 foot boom.	Clamshell dredge, 66 by 128 feet; 203-foot boom.	Wood hull 68 by 26 by 6 feet; no auxiliary plant. *Remarks.* Work consisted of building embankment for hydraulic dredges. Dredge was not constantly employed, but only during such periods as the work required. Begun Apr. 19, 1916; completed Apr. 12, 1917.

District	Washington, D. C.			Wilmington, Del.	
1. Location of dredging	Anacostia River, D. C.	Potomac River, D. C.	Aquia Creek, Va.	Cooper River, N. J.	Woodbury Creek, N. J.
2. Average depth of water	4 feet	5 feet	3 feet	12 feet	6 feet.
3. Name of contractor	Dorsey & Miller Co.	L. E. Smoot	Dorsey & Miller Co.	Delaware Dredging Co.	Delaware Dredging Co., Philadelphia, Pa.
4. Name of dredge	Daniel	W. A. Smoot No. 3	Daniel	Arizona	Alaska.
5. Date of award of contract	Oct. 18, 1916 (public notice order).	Dec. 8, 1916 (public notice order).	Apr. 13, 1917 (public notice order).	Mar. 17, 1917	Mar. 17, 1917.
6. Percentage of completion	Completed	Completed	Completed	100	96.
7. Probable date of completion of contract				Completed Aug. 17, 1917	Time limit waived.
8. Total amount of contract	$3,998.74	$1,820.25	$1,076 (1)	$4,181.14	$8,190.
9. Cost per cubic yard	9½ cents	Unit cost $4.50 per hour's work.	Unit price $50 per day	38 cents; (place measurement).	19.5 cents (place measurement).
10. Total number of cubic yards to be removed under this contract.	42,092	28,393	11,032	11,003	42,000.
11. Total number of cubic yards removed during the calendar year.	30,417	20,814	11,032	11,003	7,859.
12. Amount paid to contractor during the calendar year.	$3,998.74	$1,820.25	$350	$4,181.14	$5,642.68.
13. Average number of cubic yards removed per month.	10,106	10,000		17,475 (estimated)	17,030 (estimated).
14. Character of material	Mud	Mud	Mud	Mud	Mud and sand.
15. Average distance from work to dump.	½ mile (1)	Embankment work	Embankment work	2,000 feet	Material cast over bank alongside.
16. Size of bucket and make	1½ cubic yards; clamshell	1½ cubic yards; clamshell	1½ cubic yards; clamshell	3½ cubic yards; clamshell	2½-3 yards; clamshell.
17. Brief description of dredge and attendant plant.	Wood hull 68 by 26 by 6 feet; 2 100 cubic-yard dump scows.	Wood hull 60.5 by 30.2 by 5.6 feet; no auxiliary plant.	Wood hull 68 by 26 by 6 feet; no auxiliary plant.	(1)	(1).
	Remarks. [1] Small tug Dallman was used for towing dredged material to the dumping grounds. The material was dredged just above Pennsylvania Avenue Bridge and dumped just below Pennsylvania Railroad bridge and later placed ashore by hydraulic dredge. Begun Dec. 11, 1916, completed Mar. 22, 1917.	*Remarks.* Work consisting of building embankment for hydraulic dredges. Work begun Dec. 18, 1916, completed Feb. 1, 1917.	*Remarks.* Work consisted of building embankment for hydraulic dredge. Work began Apr. 17, completed May 5, 1917. [1] Includes cost of towing plant from Washington to Aquia Creek and back; also inspection charges.	*Remarks.* Bucket dredges Alaska and No. 4 were placing ashore the material dredged. [1] Hull 96 by 34 by 10 feet; draft 6 feet; engine, horizontal, 14 by 18 inches, 100 to 150 revolutions per minute; boiler, square leg marine, 100 horsepower; coal consumption 400 pounds per hour; length of banking boom 80 feet; necessary scows and tug.	*Remarks.* Bucket dredges Arizona and No. 4 were also used on this contract. [1] Hull 90 by 34 by 10 feet; draft, 5 feet; engine, horizontal, 12 by 18 inches, 100 to 150 revolutions per minute; boiler, Scotch, 80 horsepower; coal consumption 300 pounds per hour; length of banking boom 80 feet; coal scow and gasoline launch tender.

TABLE 12.—*Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1917*—Continued.

District	Wilmington, Del.		
1. Location of dredging	Woodbury Creek, N. J	Woodbury Creek, N. J	Smyrna River, Del.
2. Average depth of water	6 feet	6 feet	7 feet.
3. Name of contractor	Delaware Dredging Co., Philadelphia, Pa.	Delaware Dredging Co., Philadelphia, Pa.	River & Harbor Improvement Co., Philadelphia, Pa.
4. Name of dredge	No. 4	Arizona	Arizona.
5. Date of award of contract	Mar. 17, 1917	Mar. 17, 1917	May 2, 1916.
6. Percentage of completion	96	96	100.
7. Probable date of completion of contract	Time limit waived [1]	Time limit waived	Completed Mar. 24, 1917.
8. Total amount of contract	$8,190	$8,190	$16,064.50.
9. Cost per cubic yard	19.5 cents (place measurement)	19.5 cents (place measurement)	8.9 cents (place measurement).
10. Total number of cubic yards to be removed under this contract.	42,000	42,000	180,500.
11. Total number of cubic yards removed during the calendar year.	24,782	7,935	30,904.
12. Amount paid to contractor during the calendar year.	$5,642.68	$5,642.68	$5,149.19.[1]
13. Average number of cubic yards removed per month.	18,586	15,260 (estimated)	11,395.
14. Character of material	Mud and sand	Mud and sand	Mud, sand, clay, and gravel.
15. Average distance from work to dump	Material cast over bank alongside	1,500 feet	Material cast over bank alongside.
16. Size of bucket and make	2-yard, orange peel	3½-4 yard, clamshell	3½-4 yard, clamshell.
17. Brief description of dredge and attendant plant	([2])	([1])	([2]).
	Remarks. Bucket dredges Arizona and Alaska were also used on this contract. [1] Dredge removed to Hog Island for national defense work. [2] Hull, 80 by 30 by 8 feet; draft, 4 feet; engine, 12 by 14 inches, 250 revolutions per minute; boiler, locomotive; coal consumption, 375 pounds per hour; levers air operated; length of banking boom, 72 feet; gasoline launch tender and coal scow.	***Remarks.*** Bucket dredges Alaska and No. 4 were also used on this contract. [1] Hull, 96 by 34 by 10 feet; draft, 6 feet; engine, horizontal, 14 by 18 inches, 100 to 150 revolutions per minute; boiler, square leg marine 100 horsepower; coal consumption, 400 pounds per hour; length of banking boom, 80 feet; coal scow, gasoline tug, and necessary scows.	***Remarks.*** Bucket dredges Atlanta and Asia were also used on this contract. [1] Includes payment for yardage removed during Dec., 1916, paid for in Jan., 1917. [2] Hull, 96 by 34 by 10 feet; draft, 6 feet; engine, horizontal, 14 by 18 inches, 100 to 150 revolutions per minute; boiler, square leg marine, 100 horsepower; coal consumption, 400 pounds per hour; length of banking boom, 80 feet; coal scow and gasoline launch tender.

TABLE 13.

SUBAQUEOUS ROCK DRILLING BY CONTRACT.

TABLE 13.—*Subaqueous rock drilling by contract during calendar year ending Dec. 31, 1917.*

1. District	Boston, Mass.	Buffalo, N. Y.	New York, First District.		
2. Location	Gloucester Harbor, Mass.	West side entrance channel, Dunkirk, N. Y.	Hudson River, Troy, N. Y.	Hudson River at Troy, N. Y.	Coenties Reef, East River, N. Y.
2. Date of award of contract	Jan. 19, 1912	Sept. 15, 1916	Oct. 20, 1913	Oct. 20, 1913	May 22, 1916.
4. Name of contractor	John J. Fitzpatrick & Sons	Oliver E. Dunbar, Detroit, Mich.	Great Lakes Dredge & Dock Co.	Great Lakes Dredge & Dock Co.	Great Lakes Dredge & Dock Co.
5. Names of drill boats	See remarks	Earthquake	No. 3	No. 4	No. 8.
6. Number of drills		4	4	5	5.
7. Diameter of piston		5½ inches	5½ inches	5½ inches	5½ inches.
8. Stroke		7 inches	8 inches	8 inches	12 inches.
9. Size of bits		3½ inches	4 inches	4 inches	4 inches.
10. Character of material		Blue shale	Hudson River shale	Hudson River shale	Gneiss.
11. Number of cubic yards to be removed under contract.		20,000 cubic yards, place measure.	162,500 (original estimate)	162,500 (rock, original estimate).	28,555.
12. Distance rock is moved from site.		2½ miles	50 miles	50 miles	7 miles.
13. Average depth of water over rock.		6 to 8 feet, mean lake level	9 feet at lowest low water	9 feet at lowest low water	30 feet.
14. Number of cubic yards removed to date.		18,035 cubic yards, place measure.	99,266.5 (rock)	99,266.5 (rock)	37,777 cubic yards (scow measurement).
15. Amount of contract		$50,258	$1,028,871.75 (total)	$1,028,871.75 (total)	$73,678.04.[1]
16. Contract price per cubic yard in place.		$131 per cubic yard (place measure).	$2.40 and $2.90 (rock)	$2.40 and $2.90 (rock)	$6.985+.
17. Amount paid to date	$7,319.37	$23,393.85	$889,195.45 (total)	$889,195.45 (total)	$37,635.13, paid by United States.
18. Number of cubic yards removed during calendar year.		18,035 cubic yards (place measure).	556.5 (rock, this plant)	15,805.8 (rock, this plant)	37,777 cubic yards (scow measurement).
19. Amount paid to contractor during calendar year.	$7,311.38	$23,149.97	$148,713.57 (total)	$148,713.57 (total)	$37,635.13.
20. Probable date of completion.	Completed Dec. 30, 1916	Sept. 3, 1918	Completed Dec. 1, 1917	Completed Dec. 1, 1917	Time limit waived.
21. Estimated amount of rock removed per day in cubic yards.		200 cubic yards (place measure).	14 (this plant)	400 (this plant)	161.44 cubic yards.
22. Remarks and description of attendant plant and name of attendant dipper dredge.		Tipperary Boy	Wooden hull, 112 by 30 by 7½ feet, 4 spuds; drill frames 28 feet high; dipper dredges Nos. 49 and 52.	Steel hull, 36 by 132 feet, 4 spuds; dipper dredges No. 52 and No. 49.	Wood, 134 by 36 feet, 5 30-horsepower rotary engines; 2 boilers, 1 Scotch and 1 vertical; attendant dredge, Napoleon.

Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
For data see report for calendar year ending Dec. 31, 1916, only operations during 1917. being final payments under the contract.	Drill boat Earthquake: hull, steel, 106 by 30.5 feet by 6 feet, draft 3 feet, 4 drill frames, 4 Ingersoll-Rand H-64 drill hydraulic pistons for raising and lowering drills and attachments. The Earthquake worked 2 shifts of 8 hours each per day. The crew for each 8-hour shift consisted of 14 men. The drill holes were spaced 6 by 6 feet and were drilled 3 feet below the required grade of 18 feet mean lake level to insure that depth of water after dredging. The general depth of the bed rock is about 10 to 12 feet.	This plant was engaged in removing isolated points. Under contract with the Great Lakes Dredge & Dock Co. for dredging and rock removal in the Hudson River, 68,129.5 cubic yards of rock, at $2.40 per cubic yard; 31,137 cubic yards of rock, at $2.90 per cubic yard; 177.6 cubic yards of bowlders, at $2.90 per cubic yard; 386,222.9 cubic yards of soft material, at $0.43 per cubic yard; 1,162,702.9 cubic yards of soft material, at $0.4091 per cubic yard; at a total contract value of $896,060.74, were removed. The cost of operating the drill boats is included in the contract price.	Under contract with Great Lakes Dredge & Dock Co. for dredging and rock removal in the Hudson River, 68,129.5 cubic yards of rock, at $2.40 per cubic yard; 31,137 cubic yards of rock, at $2.90 per cubic yard; 177.6 cubic yards of bowlders, at $2.90 per cubic yard; 386,222.9 cubic yards of soft material, at $0.43 per cubic yard; 1,162,702.9 cubic yards of soft material, at $0.4091 per cubic yard, at a total contract value of $896,060.74, were removed. The cost of operating the drill boats is included in the contract price.	[1] Total amount of contract for removal to a depth of 40 feet below mean low water, $196,900, of which the United States is to pay the sum of $73,678.04 for the removal to a depth of 35 feet and the city of New York is to pay $123,221.96 for the removal between the planes of 35 feet and 40 feet.

TABLE 13.—*Subaqueous rock drilling by contract during calendar year ending Dec. 31, 1917*—Continued.

1. District.	New York, First District.		New York, Third District.	
2. Location.	Hudson River, Troy, N. Y.	Hudson River, Troy, N. Y.	Staten Island, N. Y. and N. J., rock. Area southeast of Shorters Island.	Staten Island Sound, N. Y. and N. J. Rock area opposite Tremley Point.
3. Date of award of contract.	Mar. 17, 1917.	Mar. 17, 1917.	Apr. 5, 1916.	Aug. 6, 1917.
4. Name of contractor.	James Stewart & Co. (Inc.).	James Stewart & Co. (Inc.).	Eugene Breymann.	Eugene Breymann.
5. Names of drill boats.	No. 62.	No. 63.	Racker Rock.	Racker Rock.
6. Number of drills.	4.	4.	2.	2.
7. Diameter of piston.	5½ inches.	5½ inches.	About 8 inches.	6½ inches.
8. Stroke.	8 inches.	8 inches.	About 12 inches.	12 inches.
9. Size of bite.	4 inches.	4 inches.	3½ inches.	3½ inches, 30 to 40 feet long.
10. Character of material.	Hudson River shale.	Hudson River shale.	Trap rock.	Trap rock.
11. Number of cubic yards to be removed under contract.	90,000 (rock, original estimate).	90,000 (rock, original estimate).	160,000 cubic yards.	17,250 cubic yards.
12. Distance rock is moved from site.	20 miles.	20 miles.	About 35 miles.	37 miles approximately.
13. Average depth of water over rock.	10 feet at lowest low water.	10 feet at lowest low water.	24 feet.	23 feet at mean low water.
14. Number of cubic yards removed to date.	8,433.7 (rock, total).	8,433.7 (rock, total).	128,093 cubic yards, entire contract, from area in question, 2,486 cubic yards.	None.
15. Amount of contract.	$358,600.	$358,600.	$79,600.	$100,792.
16. Contract price per cubic yard in place.	$2.64 (rock).	$2.64 (rock).	49¾ cents per cubic yard.	$5.86.
17. Amount paid to date.	$52,429.34 (total).	$52,429.34 (total).	$58,799.78 (entire contract).	Nothing; no dredging done.
18. Number of cubic yards removed during calendar year.	3,922.4 (rock, this plant).	4,511.3 (rock, this plant).	37,005 (entire contract).	None.
19. Amount paid to contractor during calendar year.	$52,429.34.	$52,429.34.	$18,762.28.	Nothing.
20. Probable date of completion.	Oct. 1, 1919.	Oct. 1, 1919.	Originally Nov. 24, 1917; date fixed for completion; extended for reasonable period (E. D. 97925/29).	Date set for completion May 15, 1918.
21. Estimated amount of rock removed per day in cubic yards.	50 (this plant).	70.	None removed from area since drill boat worked over it.	None removed.
22. Remarks and description of attendant plant and name of attendant dipper dredge.	Wooden hull, 89 by 17.5 by 5.5 feet; boiler horsepower, 150; dipper dredges, Blizzard and Hurricane; bucket dredge No. 72.	Wooden hull, 90 by 30 by 6.3 feet; boiler horsepower, 150; dipper dredges, Blizzard and Hurricane; bucket dredge No. 72.	Drill boat attended by a towboat and a motor boat. No dredge on job while drill boat was working.	The dimensions of the drill boat are: Length, 103 feet; width, 34 feet; draft, 7 feet; equipped with 2 locomotive boilers 6 feet diameter 18 feet long, 100 pounds pressure, 1 pressure pump, 5-inch suction, 300 to 350 pounds pressure; 1 washout and bilge pump, 3-inch suction, 5-inch discharge; attended by 1 towboat part of time. No dredging done while dredge was working.

Remarks.	Remarks.	Remarks.	Remarks.
Under contract with James Stewart & Co. (Inc.) there were removed 8,433.7 cubic yards of rock, at $2.64 per cubic yard, and 65,436.1 cubic yards of soft material, at $0.55 per cubic yard, at a total contract value of $58,254.82. There remains to be removed under this contract approximately 80,000 cubic yards of rock and 155,000 cubic yards of soft material. The amount available for expenditure under this contract is approximately $580,000. The cost of operation of the drill boat is included in the contract price. There were drilled and blasted approximately 5,000 cubic yards of rock which has not as yet been removed. Work under this contract was suspended Oct. 12, 1917, due to the inability of the contractor to obtain a sufficient coal supply.	Under contract with James Stewart & Co. (Inc.) there were removed 8,433.7 cubic yards of rock, at $2.64 per cubic yard, and 65,436.1 cubic yards of soft material, at $0.55 per cubic yard, at a total contract value of $58,254.82. There remains to be removed under this contract approximately 80,000 cubic yards of rock and 155,000 cubic yards of soft material. The amount available for expenditure under this contract is approximately $480,000. The cost of operation of the drill boat is included in the contract price. There were drilled and blasted approximately 5,000 cubic yards of rock which has not as yet been removed. Work under this contract was suspended Oct. 12, 1917, due to the inability of the contractor to obtain a sufficient coal supply.	31,907 cubic yards still to be removed. $18,762.28 available for expenditure.	17,250 cubic yards still to be removed. $100,792 amount available for expenditure.

TABLE 13.—*Subaqueous rock drilling by contract during calendar year ending Dec. 31, 1917*—Continued.

1. District	Philadelphia, Pa.		
2. Location	Delaware River at Trenton, N. J.	Delaware River (Philadelphia Harbor)	Delaware River, Tinicum, Chester, and Marcus Hook Ranges.
3. Date of award of contract	Oct. 24, 1916	Nov. 27, 1916	Feb. 1, 1917.
4. Name of contractor	Canal Construction Co. (Inc.), New York	Great Lakes Dredge & Dock Co., New York.	Maryland Dredging & Contracting Co.
5. Names of drill boats	No. 1	No. 4	Weymouth, May 31, 1917, to Oct. 25, 1917; No. 2, Oct. 26, 1917.
6. Number of drills	2	5	Weymouth, 3 drills; No. 2, 2 drills to Dec. 12, 1917.
7. Diameter of piston	5½ inches	5½ inches	Weymouth, 7 inches; No. 2, 5½ inches.
8. Stroke	8 inches	8 inches	Weymouth, 10 inches; No. 2, 8 inches.
9. Size of bits	4 inches	4 inches	Weymouth, 4½ inches; No. 2, 3¾ inches.
10. Character of material	Granite	Gneiss	Pyroxenite.
11. Number of cubic yards removed under contract.	16,220 rock; 60,936 overburden	65,000 cubic yards rock; 520,000 overburden	To 35 feet; rock, 3,830 cubic yards; overburden, 10,270 cubic yards.
12. Distance rock is moved from site	5 miles	29 miles	10 miles.
13. Average depth of water over rock	7 feet	28 feet	31 feet.
14. Number of cubic yards removed to date.	16,220 rock; 60,936 overburden		
15. Amount of contract	$79,963.78	$760,500 (to 35 feet depth)	(Approximate) $63,420.50 to 35 feet.
16. Contract price per cubic yard in place.	(1)	$8.50 to 35 feet; $4.25 from 35 to 38 feet: overburden, 40 cents.	Rock, $14.95 per cubic yard; overburden, 60 cents per cubic yard.
17. Amount paid to date	$79,963.78		
18. Number of cubic yards removed during calendar year.	11,631 rock; 52,739 overburden		
19. Amount paid to contractor during calendar year.	$66,761.78		
20. Probable date of completion	Contract expired Dec. 15, 1917	Dec. 31, 1919	Dec. 15, 1918.
21. Estimated amount of rock removed per day in cubic yards.	60		
22. Remarks and description of attendant plant and name of attendant dipper dredge.	(1)	1 drill boat, 1 coal scow, 1 motor boat-dredge not yet placed on work.	1 tug, 1 deck scow, 1 dump scow; no dredging done to date.
	Remarks.	*Remarks.*	*Remarks.*
	[1] Contract provides for removal of rock and overburden by plant consisting of 1 dipper dredge (Newburgh or President), 1 tug boat, 1 drill boat (No. 1), 1 coal scow, 5 dump scows, 1 anchor scow and 1 dynamite scow, fully equipped and manned at the price of $287 per working day.	520,000 cubic yards overburden and other material. 65,000 cubic yards rock remaining to be removed. Amount available for expenditure, $405,000.00.	3,830 cubic yards rock and 10,270 cubic yards overburden remaining to be removed. Amount available for expenditure, $80,000.

FINDING LIST.

SHOWING THE SUBDIVISIONS OF THIS REPORT BY DISTRICTS.

[The references in roman are to part (or volume) and those in arabic to page.]

Page.
River and Harbor Board — I, 79; II, 2001
Portland, Me — I, 81; II, 2005
Boston, Mass — I, 103; II, 2017
Newport, R. I — I, 150; II, 2049
New London, Conn — I, 178; II, 2069
New York City, first district — I, 229; II, 2095
New York City, second district — I, 299; II, 2151
New York City, third district — I, 339; II, 2175
Philadelphia, Pa — I, 378; II, 2201
Wilmington, Del — I, 400; II, 2225
Baltimore, Md — I, 459; II, 2255
Washington, D. C — I, 507; II, 2287
Norfolk, Va — I, 537; II, 2309
Wilmington, N. C — I, 582; II, 2337
Charleston, S. C — I, 647; II, 2387
Savannah, Ga — I, 678; II, 2405
Jacksonville, Fla — I, 731; II, 2427
Montgomery, Ala — I, 812; II, 2479
Mobile, Ala — I, 865; II, 2521
New Orleans, La — I, 911; II, 2555
Galveston, Tex — I, 987; II, 2621
Dallas, Tex — I, 1057; II, 2655
Vicksburg, Miss — I, 1087; II, 2677
Little Rock, Ark — I, 1127; II, 2707
St. Louis, Mo — I, 1155; II, 2725
Rock Island, Ill — I, 1162; II, 2747
St. Paul, Minn — I, 1181; II, 2781
Kansas City, Mo — I, 1210; II, 2793
Nashville, Tenn — I, 1242; II, 2837
Chattanooga, Tenn — I, 1255; II, 2857
Florence, Ala — I, 1286; II, 2879
Ohio River, locks and dams — I, 1292; II, 2885
Pittsburgh, Pa — I, 1308; II, 2975
Wheeling, W. Va — I, 1326; II, 3005
Cincinnati, Ohio, first district — I, 1332; II, 3023
Louisville, Ky — I, 1337; II, 3033
Cincinnati, Ohio, second district — I, 1346; II, 3051
Duluth, Minn — I, 1358; II, 3077
Milwaukee, Wis — I, 1392; II, 3097
Chicago, Ill — I, 1448; II, 3131
Grand Rapids, Mich — I, 1480; II, 3155
Detroit, Mich — I, 1527; II, 3199
Cleveland, Ohio — I, 1572; II, 3259
Buffalo, N. Y — I, 1609; II, 3279
Los Angeles, Cal — I, 1655; III, 3317
San Francisco, Cal., first district — I, 1670; III, 3325
San Francisco, Cal., third district — I, 1699; III, 3339
Portland, Oreg., first district — I, 1719; III, 3351
Portland, Oreg., second district — I, 1762; III, 3377
Seattle, Wash — I, 1795; III, 3403
Honolulu, Hawaii — I, 1839; III, 3433
San Juan, P. R — I, 1848; III, 3441
California Débris Commission — I, 1852; III, 3445

INDEX.

[The references in roman are to part (or volume) and those in arabic to page.]

A.

Page.
Abraham Lincoln Memorial, District of Columbia — I, 1942; III, 3801
Absecon Creek, N. J., improvement — I, 424; II, 2238
Absecon Inlet, N. J., improvement — I, 422; II, 2237
Academy Creek, Brunswick Harbor, Ga., improvement — I, 724; II, 2423
Acushnet River, New Bedford Harbor, Mass., improvement — I, 154; II, 2051
Adams Creek, N. C., improvement of waterway via — I, 569; II, 2329
Agate Bay Harbor, Minn., improvement — I, 1360; II, 3077
Alabama River, Ala., improvement — I, 853; II, 2510
Alabama, State of, removal of water hyacinths from — I, 983; II, 2619
Alaska, Board of Road Commissioners for — I, 1986; III, 3841
Albemarle & Chesapeake Canal, N. C. and Va., improvement — I, 569; II, 2329
Albemarle Sound, N. C., improvement of waterway to Norfolk, Va., via Pasquotank River — I, 567; II, 2327
Alexandria, Va., improvement of Potomac River at — I, 514; II, 2291
Algoma Harbor, Wis., improvement — I, 1414; II, 3110
Allegheny River, Pa.:
  Construction of locks and dams — I, 1317; II, 2993
  Improvement by open-channel work — I, 1315; II, 2991
  Improvement of Pittsburgh Harbor — I, 1322; II, 3000
  Operating and care of locks and dams — I, 1321; II, 2994
Alligator Creek, S. C., improvement of waterway from McClellanville to Charleston — I, 667; II, 2399
Alligator River, N. C., improvement of waterway via — I, 569; II, 2329
Alloway Creek, N. J., improvement — I, 413; II, 2232
Alpena Harbor, Mich.:
  Examination and survey — I, 1572
  Improvement — I, 1554; II, 3246
Altamaha River, Ga., improvement — I, 715; II, 2419
Ambrose Channel, New York Harbor, N. Y., improvement — I, 300; II, 2151
American Red Cross, memorial to women of Civil War to be used by — I, 1943; III, 3802
Amite River, La., improvement — I, 933; II, 2586
Anacostia River, D. C.:
  Improvement — I, 511; II, 2290
  Reclamation and development of the flats — I, 1904; III, 3755
Anahuac Channel, Tex., improvement — I, 1012; II, 2636
Anchorage grounds, rules for establishment of — I, 1878
Anclote River, Fla., improvement — I, 781; II, 2400
Antiaircraft defense — I, 38
Apalachicola Bay, Harbor, and River, Fla.:
  Examination and survey of channel through St. George Sound to Gulf of Mexico — I, 864
  Improvement of channel to St. Andrews Bay — I, 829; II, 2493
  Improvement of harbor in bay — I, 815; II, 2481
  Improvement of river, including the Cut-off, Lee Slough, and lower Chipola River — I, 817; II, 2483
Apoon Mouth, Yukon River, Alaska, improvement — I, 1833; III, 3431
Appomattox River, Va., improvement — I, 553; II, 2322
Appoquinimink River, Del., improvement — I, 435; II, 2242

Page.

- Appropriations:
  - Allotments and transfers under river and harbor act of March 4, 1915 — I, 78
  - Fortifications — I, 42
  - Locks and dams, Ohio River — I, 1305
  - Rivers and harbors — I, 77
- Aqueduct Bridge, Washington, D. C., repair — I, 1909
- Aqueduct, Washington, D. C., maintenance and repair of — I, 1916; III, 3759
- Aquia Creek, Va., improvement — I, 521; II, 2295
- Aransas Bay and Pass, Tex.:
  - Examination and survey of channel to Corpus Christi — I, 1056
  - Improvement at Harbor Island — I, 1051; II, 2651
  - Improvement of channel to Corpus Christi (via Turtle Cove) — I, 1042; II, 2647
  - Improvement of channel to Pass Cavallo — I, 1039; II, 2646
  - Improvement of channel to Victoria (on Guadalupe River) — I, 1035; II, 2645
  - Improvement of Pass — I, 1051; II, 2651
- Arcadia Harbor, Mich., improvement — I, 1514; II, 3187
- Arcata Channels, Humboldt Bay, Cal., examination — I, 1697
- Arkansas River, Ark.:
  - Examination and survey — I, 1155
  - Improvement — I, 1127; II, 2707
- Arlington Memorial Amphitheater and Chapel — I, 1944; III, 3803
- Arlington Memorial Bridge Commission — I, 1945; III, 3804
- Armory Commission of District of Columbia — I, 1943; III, 3802
- Arthur Kill, N. Y. and N. J., improvement — I, 347, 350; II, 2182
- Arthur Lake, Mermentau River, La., improvement — I, 971; II, 2613
- Artillery fire at long ranges — I, 37
- Ashland Harbor, Wis., improvement — I, 1372; II, 3085
- Ashley River, S. C.:
  - Examination — I, 677
  - Improvement — I, 674; II, 2403
- Ashtabula Harbor, Ohio, improvement — I, 1600; II, 3274
- Assistants:
  - Civilian, to Engineer officers — I, 63
  - On duty in the office of the Chief of Engineers — I, 1997
- Association of Congresses of Navigation, Permanent International — I, 1873
- Atchafalaya Bay Ship Channel Co., maintenance of channel from Morgan City to the Gulf of Mexico by — I, 955; II, 2602
- Atchafalaya River, La.:
  - Examination — I, 986
  - Improvement — I, 955; II, 2602
  - Removing snags and wrecks — I, 1159; II, 2741
- Augusta, Ga.:
  - Improvement of Savannah River above — I, 690; II, 2411
  - Improvement of Savannah River at — I, 687; II, 2410
  - Improvement of Savannah River below — I, 684; II, 2409
- Augusta Narrows, White River, Ark., improvement — I, 1134; II, 2711
- Aux Becs Scies Lake, Frankfort Harbor, Mich., improvement — I, 1516; II, 3188

B.

- Back Bay of Biloxi, Miss.:
  - Examination and survey — I, 910
  - Improvement of Biloxi Harbor — I, 900; II, 2549
- Back Cove, Portland Harbor, Me., improvement — I, 96; II, 2011
- Back Creek to York River, Va., examination — I, 537
- Back (Weymouth) River, Mass., improvement — I, 142; II, 2045
- Ballard, Wash., improvement of Lake Washington Canal — I, 1815; III, 3416
- Baltimore, Md.:
  - Defenses of — I, 34
  - Engineering district — I, 459; II, 2255
  - Improvement of harbor and channels — I, 460; II, 2255
- Banana Creek, Fla., examination — I, 811
- Bangor Harbor, Penobscot River, Me., improvement — I, 87; II, 2007
- Bar Harbor, Me., construction and breakwater — I, 84; II, 2006
- Bar Lake, Arcadia Harbor, Mich., improvement — I, 1514; II, 3187
- Barrage fire — I, 36

Page.

- Barren River, Ky., operating and care of lock and dam — I, 1341; II, 3035
- Bartholomew Bayou, La. and Ark., improvement — I, 1101; II, 2688
- Bass Harbor, Me., improvement — I, 86; II, 2007
- Bastrop Bayou, Tex., improvement — I, 1026; II, 2641
- Batteries, gun and mortar — I, 42
- Battery, The, New York Harbor, N. Y., removal of shoal in Hudson River off Pier A — I, 262; II, 2122
- Bay Ridge Channel, New York Harbor, N. Y.:
  - Examination and survey — I, 338
  - Improvement — I, 308; II, 2156
- Bay River, N. C., improvement — I, 595; II, 2346
- Bayside Channel, New York Harbor, N. Y., improvement — I, 300; II, 2151
- Beach Creek, Va., examination — I, 537
- Bear Creek, Miss., improvement — I, 1116; II, 2699
- Beaufort Harbor and River, N. C.:
  - Improvement of harbor — I, 614; II, 2360
  - Improvement of waterway to Core Sound — I, 617; II, 2362
  - Improvement of waterway to Jacksonville, N. C — I, 619; II, 2364
  - Improvement of waterway to New River — I, 619; II, 2364
- Beaufort Inlet, N. C.:
  - Improvement — I, 625; II, 2367
  - Improvement of waterway to Norfolk, Va — I, 569; II, 2329
  - Improvement of waterway to Pamlico Sound — I, 611; II, 2357
  - Operating and care, waterway to Norfolk, Va — I, 574; II, 2331
- Beaufort, S. C.:
  - Improvement of waterway to St. Johns River, Fla — I, 693; II, 2412
  - Improvement of waterway to Savannah, Ga — I, 693; II, 2412
- Bee Tree Shoals Canal, Tennessee River, Ala., operating and care — I, 1276; II, 2875
- Bellingham Bay and Harbor, Wash., improvement of Whatcom Creek waterway (New Whatcom Harbor) — I, 1826; III, 3427
- Benton Harbor Canal, St. Joseph Harbor, Mich., improvement — I, 1481; II, 3155
- Berkeley Harbor, Cal., examination and survey — I, 1697
- Beverly Harbor, Mass., improvement — I, 123; II, 2031
- Big Kanawha River, W. Va., operating and care of locks and dams — I, 1330; II, 3011
- Big Sandy River, W. Va. and Ky.:
  - Improvement, including Tug and Levisa Forks — I, 1349; II, 3061
  - Operating and care of locks and dams — I, 1353; II, 3063
- Big Sunflower River, Miss.:
  - Improvement — I, 1117; II, 2700
  - Operating and care of lock and dam — I, 1126; II, 2706
- Big Thoroughfare River, Md., improvement — I, 504; II, 2285
- Biloxi Harbor, Miss.:
  - Examination and survey of Back Bay of Biloxi — I, 910
  - Improvement — I, 900; II, 2549
- Biscayne Bay, Fla.:
  - Examination and survey — I, 812
  - Improvement — I, 756; II, 2444
- Bistineau Lake, La., examination — I, 1127
- Blackfish Bayou, Ark., improvement — I, 1145; II, 2718
- Black Lake, Holland Harbor, Mich., improvement — I, 1491; II, 3163
- Black River, Ark. and Mo.:
  - Examination and survey — I, 1155
  - Improvement — I, 1139; II, 2714
- Black River, La., improvement — I, 1091; II, 2680
- Black River, Lorain, Ohio:
  - Examination — I, 1608
  - Improvement — I, 1588; II, 3267
- Black River, Mich., improvement — I, 1561; II, 3253
- Black River, N. C., improvement — I, 640; II, 2379
- Black River, Wash., examination — I, 1838
- Black River, Wis., operating snag and dredge boats — I, 1173; II, 2774
- Black Rock Harbor and Channel, N. Y.:
  - Improvement — I, 1621; II, 3290
  - Improvement of Lake Erie entrance — I, 1621; II, 3290
  - Operating and care of canal and lock, etc — I, 1631; II, 3295

Page.

- Black Rock Harbor, Conn., improvement — I, 211; II, 2085
- Black Warrior River, Ala.:
  - Improvement — I, 872; II, 2528
  - Operating and care of locks and dams — I, 885; II, 2533
- Blackwater River, Fla., improvement — I, 843; II, 2504
- Blackwater River, Va., improvement — I, 575; II, 2383
- Block Island, R. I.:
  - Construction of harbor of refuge — I, 173; II, 2064
  - Improvement of Great Salt Pond — I, 175; II, 2065
- Blood River, La., improvement — I, 930; II, 2585
- Boards:
  - *See also* Commissions.
  - Engineers for Rivers and Harbors — I, 79; II, 2001
  - Experimental towboats, Mississippi River — I, 1873; II, 3455
  - Fortifications or other defenses (Endicott Board) — I, 34
  - National coast defense — I, 34
  - Road commissioners for Alaska — I, 1986; III, 3841
  - The Board of Engineers — I, 33
- Boca Ceiga Bay, Fla., improvement — I, 779; II, 2459
- Boeuf Bayou, La.:
  - Examination and survey — I, 985
  - Improvement — I, 1099; II, 2687
- Bogue Falia, La., improvement — I, 925; II, 2582
- Bogues Bay, Va., improvement — I, 457; II, 2254
- Bogue Sound, N. C., improvement — I, 619; II, 2364
- Bohicket and Church Creeks and Church Flats, S. C., examination — I, 677
- Booms, permits for erection of — I, 1886
- Boston, Mass.:
  - Defenses — I, 34
  - Engineering district — I, 103; II, 2017
  - Improvement of harbor — I, 111; II, 2020
- Braden River, Fla., examination and survey — I, 812
- Brandywine River, Wilmington Harbor, Del., improvement — I, 432; II, 2240
- Branford Harbor, Conn., improvement — I, 199; II, 2079
- Brazos Island Harbor, Tex., examination and survey — I, 1056
- Brazos River, Tex.:
  - Examination for flood control — I, 1087
  - Improvement between Old Washington and Waco — I, 1075; II, 2670
  - Improvement between Velasco and Old Washington — I, 1049; II, 2651
  - Improvement of channel to Matagorda Bay — I, 1033; II, 2644
  - Improvement of mouth — I, 1045; II, 2648
  - Operating and care of locks and dams — I, 1077; II, 2671
  - Reexamination from Old Washington to Waco — I, 1087
- Brentons Cove, R. I., removal of Nourmahal Rock — I, 161; II, 2057
- Bridgeport Harbor, Conn., improvement — I, 211; II, 2085
- Bridges:
  - Alteration of, obstructing navigation — I, 1885
  - Aqueduct Bridge, Washington, D. C — I, 1909
  - Construction across navigable waters — I, 1879
  - Highway Bridge, Washington, D. C — I, 1922; III, 3773
  - Key Bridge, Potomac River at Georgetown, D. C., construction — I, 1912
  - Rules governing opening of draws — I, 1879
  - Yellowstone National Park — I, 1972; III, 3827
- Broad Creek, Md., improvement — I, 501; II, 2283
- Broad Creek, N. C., examination — I, 647
- Broad Creek River, Del., improvement — I, 491; II, 2277
- Broadkill River, Del., improvement — I, 449; II, 2250
- Broad River, S. C., examination — I, 677
- Broad Sound, Boston Harbor, Mass., improvement — I, 111; II, 2020
- Bronx (Harlem) Kills, N. Y., examination and survey — I, 299
- Bronx River, N. Y., improvement — I, 244; II, 2104
- Browns Creek, N. Y., improvement — I, 336; II, 2172
- Brulé Plaquemine Bayou, La., improvement — I, 977; II, 2616
- Brunswick Harbor, Ga., improvement — I, 724; II, 2423
- Brunswick River, N. C., improvement of Cape Fear River below Wilmington — I, 629; II, 2370

Page.

Budd Inlet, Olympia Harbor, Wash., improvement I, 1810; III, 3409
Buffalo Bayou, Tex.:
  Examination and survey I, 1056
  Improvement of waterway to Houston I, 1002; II, 2631
Buffalo, N. Y.:
  Engineering district I, 1609; II, 3279
  Examination and surveys I, 1654
  Improvement of Black Rock Channel and Tonawanda Harbor, I, 1621; II, 3290
  Improvement of harbor I, 1616; II, 3285
  Operating and care of Black Rock Canal and Ferry Street Bridge, I, 1631; II, 3295
Bulkhead lines, establishment I, 1888
Burlington Harbor, Vt., improvement I, 290; II, 2147
Burr Creek, Conn., improvement I, 211; II, 2085
Buzzards Bay, Mass.:
  Examination and survey of bay and approaches to Cape Cod Canal I, 177
  Examination and survey of waterway to Cape Cod Bay I, 177
Byram River, Port Chester Harbor, N. Y., improvement I, 230; II, 2095

C.

Caddo Lake, Tex. and La.:
  Improvement by construction of dam at foot of I, 1082; II, 2675
  Operating and care of dam at foot of I, 1086; II, 2676
Calaveras River, Cal., improvement I, 1706; III, 3342
Calcasieu Pass and River, La.:
  Examinations and surveys I, 986
  Improvement I, 979; II, 2617
California Débris Commission I, 1852; III, 3445
Caloosahatchee River, Fla.:
  Examination and survey I, 810
  Improvement I, 768; II, 2451
Calumet Harbor and River, Ill. and Ind.:
  Improvement of harbor (South Chicago Harbor) I, 1456; II, 3137
  Improvement of river I, 1459; II, 3139
Cambridge Harbor, Md., improvement I, 485; II, 2274
Camps for training Engineer reserve officers I, 28
Camps, mobilization I, 17
Canada, Dominion of:
  Commerce through St. Marys Falls Canal I, 1546; II, 3219
  Transmission of electrical power into United States at Niagara Falls, I, 1969; III, 3821
Canals:
  See also Waterways.
  Albemarle & Chesapeake Canal, N. C., improvement I, 569; II, 2329
  Appropriation for operation and care I, 77
  Bee Tree Shoals Canal, Ala., operating and care I, 1276; II, 2875
  Benton Harbor Canal, St. Joseph Harbor, Mich., improvement, I, 1481; II, 3155
  Black Rock Canal and Ferry Street Bridge, Buffalo, N. Y., operating and care I, 1631; II, 3295
  Calaveras River, Cal., to Mormon Channel, San Joaquin River, improvement I, 1706; III, 3342
  Cape Cod Canal, examination and survey of canal and approaches to I, 177
  Care and maintenance, appropriation for I, 77
  Cascades Canal, Columbia River—
    Construction I, 1746; III, 3365
    Operating and care I, 1759; III, 3372
  Colbert Shoals Canal, Ala., operating and care I, 1276; II, 2875
  Dalles-Celilo Canal, Oreg. and Wash.—
    Improvement I, 1748; III, 3366
    Operating and care I, 1760; III, 3373
  Des Moines Rapids Canal and Dry Dock, Mississippi River, operating and care I, 1171; II, 2771
  Dismal Swamp Canal, Va. and N. C., improvement of waterway via, I, 567; II, 2327

Canals—Continued. Page.
- East Coast Canal, St. Johns River to Key West, Fla., examination I, 811
- Elk River Shoals Canal, Ala., operating and care I, 1290; II, 2880
- Estherville-Minim Creek Canal, S. C., improvement I, 659; II, 2394
- Illinois & Michigan Canal, war emergency work I, 1477; II, 3153
- Illinois & Mississippi Canal, Ill.—
  - Improvement I, 1176; II, 2777
  - Operating and care I, 1177; II, 2778
- Keokuk (Des Moines Rapids) Canal and Dry Dock, Mississippi River. operating and care I, 1171; II, 2771
- Lake Washington Canal, Wash.—
  - Improvement I, 1815; III, 3416
  - Operating and care I, 1831; III, 3429
- Louisville & Portland Canal, Ohio River, Ky.—
  - Enlargement I, 1292; II, 2925
  - Operating and care I, 1306; II, 2968
- Muscle Shoals Canal, Ala., operating and care I, 1290; II, 2880
- Navigation of, regulations for I, 1877
- Operation and care, appropriation for I, 77
- Portage Lake Canals, Mich., improvement I, 1378; II, 3068
- Port Arthur Ship Canal, Tex.—
  - Examination and survey I, 1087
  - Improvement I, 1057; II, 2655
- Regulations for navigation I, 1877
- Sabine-Neches Canal—
  - Contributions for improvement I, 1063
  - Examination and survey I, 1087
  - Improvement I, 1061; II, 2660
- St. Clair Flats Canal, Mich., operating and care I, 1547; II, 3241
- St. Marys Falls Canal, Mich.—
  - Commercial statistics I, 1547; II, 3219
  - Improvement I, 1527; II, 3199
  - Operating and care I, 1546; II, 3214
- San Joaquin River, Cal., Mormon Channel to Calaveras River, improvement I, 1706; III, 3342
- Sturgeon Bay and Lake Michigan Canal, Wis., improvement I, 1411; II, 3108
- Welland Canal, report on connecting waters of Great Lakes I, 1654
- West Galveston Bay and Brazos River Canal, Tex., improvement I, 1030; II, 2642

Canaveral Harbor, Fla., examination I, 811

Caney and Live Oak Creeks, Tex., examination and survey I, 1056

Cannes, des, Bayou, La.:
- Examination and survey I, 986
- Improvement I, 973; II, 2813

Cape Ann, Mass., harbor of refuge, improvement I, 109; II, 2020

Cape Charles City Harbor, Va., improvement I, 563; II, 2324

Cape Cod Canal, examination and survey of canal and approaches to I, 177

Cape Fear River, N. C.:
- Defenses I, 34
- Examination and survey I, 646
- Examination and survey of Northeast Branch I, 647
- Improvement above Wilmington I, 634; II, 2374
- Improvement at and below Wilmington I, 629; II, 2370
- Improvement of Northeast Branch I, 638; II, 2377
- Operating and care of Lock and Dam No. 1 I, 643; II, 2381

Cape Lookout, N. C., improvement of harbor of refuge I, 628; II, 2368

Cape May, N. J.:
- Examination and survey of waterway to New York Bay on coast of New Jersey I, 459
- Improvement of Cold Spring Inlet, N. J I, 420; II, 2235

Cape Vincent Harbor, N. Y.:
- Examination and survey I, 1654
- Improvement I, 1648; II, 3312

Capitol, Washington, D. C., telegraph line I, 1940; III, 3799

Carrabelle Harbor and River, Fla., improvement I, 812; II, 2479

Cascades Canal, Columbia River, Oreg.:
- Construction I, 1746; III, 3365
- Operating and care I, 1759; III, 3372

Page.

- Casemates, mining … I, 49
- Cat River, Va., improvement of waterway, via … I, 457; II, 2254
- Cavallo Pass, Tex.:
  - Improvement of channel to Aransas Pass … I, 1030; II, 2646
  - Improvement of channel to Port Lavaca … I, 1038; II, 2645
- Cedar Bayou, Tex., improvement … I, 1018; II, 2638
- Cedar Creek, Conn., improvement … I, 211; II, 2085
- Celilo Falls, Columbia River … I, 1751; III, 3366
- Chambersia (Anahuac) Channel, Tex., improvement … I, 1012; II, 2636
- Champlain Lake, N. Y. and Vt.:
  - Burlington Harbor, Vt., improvement … I, 290; II, 2147
  - Macdonough Memorials … I, 1998
  - Narrows, improvement … I, 287; II, 2146
  - Plattsburg Harbor, N. Y., improvement … I, 293; II, 2148
  - Port Henry Harbor, N. Y., improvement … I, 296; II, 2149
- Channels. *See* Rivers and harbors, Canals, *and* Waterways.
- Charles River, Boston, Mass., improvement … I, 111; II, 2020
- Charleston, S. C.:
  - Defenses … I, 34
  - Engineering district … I, 647; II, 2387
  - Examination and survey of harbor … I, 677
  - Improvement of harbor … I, 670; II, 2401
  - Improvement of waterway to McClellanville … I, 667; II, 2399
- Charlevoix Harbor, Mich., improvement … I, 1518; II, 3192
- Charlotte Harbor, Fla.:
  - Examination and survey … I, 812
  - Improvement … I, 774; II, 2455
- Charlotte Harbor, N. Y.:
  - Examination and survey … I, 1654
  - Improvement … I, 1634; II, 3302
- Charts. *See* Maps and charts.
- Chattahoochee River, Ga. and Ala.:
  - Examination and survey … I, 864
  - Improvement below Columbus … I, 826; II, 2490
- Chattanooga, Tenn., engineering district … I, 1255; II, 2857
- Cheboygan Harbor, Mich., improvement … I, 1550; II, 3244
- Cheesequake Creek, N. J., improvement … I, 364; II, 2193
- Chefuncte River, La., improvement … I, 925; II, 2582
- Chehalis River, Wash., improvement … I, 1802; III, 3406
- Chelsea Creek, Boston Harbor, Mass., improvement … I, 111; II, 2020
- Chene Bayou, La., examination and survey … I, 986
- Chequamegon Bay, Ashland Harbor, Wis., improvement … I, 1372; II, 3085
- Chesapeake Bay., Md. and Va.:
  - Defense at entrance … I, 34
  - Thimble Shoal, improvement … I, 543; II, 2316
  - Waterway to Beaufort Inlet, improvement … I, 569; II, 2329
  - Waterway to sounds of North Carolina (to Pamlico Sound), improvement … I, 567; II, 2327
  - York Spit, removal of shoals opposite … I, 460; II, 2255
- Chester River, Md., improvement … I, 470; II, 2263
- Chester River, Pa., improvement … I, 430; II, 2240
- Chicago Harbor and River, Ill.:
  - Improvement of harbor … I, 1448; II, 3131
  - Improvement of river … I, 1453; II, 3136
- Chicago, Ill.:
  - Drainage canal … I, 1972
  - Engineering district … I, 1448; II, 3131
- Chickasahay River, Miss., improvement … I, 894; II, 2547
- Chief of Engineers, officers on duty in the office of the … I, 1997
- Chincoteague Inlet and Bay, Va.:
  - Waterway on coast of Virginia, improvement … I, 457; II, 2254
  - Waterway to Delaware Bay, improvement … I, 455; II, 2253
- Chipola River, Fla.:
  - Improvement of lower river … I, 817; II, 2483
  - Improvement of upper river … I, 821; II, 2484

Page
Chippewa River, Wis., operating snag and dredge boats -------- I, 1173; II, 2774
Chocolate Bayou, Tex., improvement -------- I, 1024; II, 2641
Choctawhatchee River, Fla. and Ala., improvement -------- I, 836; II, 2438
Choptank River, Md., improvement -------- I, 481; II, 2270
Christiana River, Del., improvement of Wilmington Harbor -------- I, 432; II, 2240
Church and Bohicket Creeks and Church Flats, S. C., examination -------- I. 677
Cincinnati, Ohio:
  First Engineering district -------- I, 1332; II, 3023
  Second engineering district -------- I, 1346; II, 3051
Civilian assistants to Engineer officers -------- I. 63
Civilian employees, office of the Chief of Engineers -------- I, 33
Civil War, Women of, Memorial to -------- I, 1943; III. 3802
Claiborne Harbor, Md., improvement -------- I, 474; II, 2267
Classon Point Harbor, N. Y., examination -------- I. 299
Clatskanie River, Oreg., improvement -------- I, 1773; III, 3389
Clear Creek, Tex., improvement -------- I, 1020; II, 2639
Clearwater Harbor, Fla., improvement of channel to Tampa Bay -------- I, 779; II, 2459
Clearwater River, Idaho, examination and survey -------- I, 1762
Cleveland, Ohio:
  Engineering district -------- I, 1572; II. 3259
  Improvement of harbor -------- I, 1591; II, 3270
Clinch River, Tenn.:
  Examination at mouth -------- I, 1286
  Improvement -------- I, 1280; II, 2877
Clinton River, Mich., improvement -------- I, 1564; II, 3255
Coast defenses -------- I, 34
Cocodrie Bayou, La., examination and survey -------- I. 985
Coenties Reef, New York Harbor, N. Y., removal -------- I, 249; II. 2117
Cohansey River, N. J., improvement -------- I, 415; II, 2233
Coinjock Bay, N. C., improvement of waterway via -------- I, 569; II, 2329
Colbert Shoals Canal, Tennessee River, Ala., operating and care -------- I, 1276; II, 2875
Cold Spring Inlet, N. J., improvement -------- I, 420; II, 2235
Coldwater River, Miss., improvement -------- I, 1113; II, 2697
Colorado River, Ariz., improvement -------- I, 1655; III. 3317
Colorado River, Tex.:
  Examination and survey -------- I, 1056
  Examination for flood control -------- I, 1056
Columbia River, Oreg. and Wash.:
  Cascades Canal—
    Construction -------- I, 1746; III, 3365
    Operating and care -------- I, 1759; III, 3372
  Celilo Falls to Snake River, including tributaries, improvement from -------- I, 1751; III. 3367
  Celilo Falls to The Dalles Rapids, improvement -------- I, 1748; III. 3366
  Celilo Falls to The Dalles Rapids, operating and care of canal and locks -------- I, 1760; III, 3373
  Defenses -------- I. 34
  Examinations and surveys -------- I, 1761, 1794
  Examination of channel to St. Helens, Oreg -------- I, 1794
  Mouth, defenses -------- I. 34
  Mouth, improvement -------- I, 1763; III. 3377
  Mouth to Willamette River, improvement -------- I, 1766; III. 3381
  Threemile Rapids, improvement -------- I, 1748; III. 3366
  Wenatchee, Wash., to Kettle Falls, improvement -------- I, 1828; III, 3428
  Youngs Bay Channel, examination and survey -------- I, 1794
Columbia Slough, Oreg., examination and survey -------- I, 1761
Commencement Bay, Wash., improvement -------- I, 1812; III, 3410
Commissioned officers:
  Duties -------- I, 3
  Engineer Officers' Reserve Corps -------- I. 8
  Increase in number of, provided by act of June 3, 1916 -------- I. 7
  Officers on duty in office of the Chief of Engineers -------- I, 1997
  Number, distribution, and changes during the year -------- I. 3

Commissions:
    See also Boards. Page.
    Arlington Memorial Bridge Commission ... I, 1945; III, 3804
    California Débris Commission ... I, 1852; III, 3445
    District of Columbia Armory Commission ... I, 1943; III, 3802
    Fine Arts Commission ... I, 1943; III, 3802
    Mississippi River Commission ... I, 1866; III, 3459
    Permanent International Association of Congresses of Navigation ... I, 1873
    Public buildings ... I, 1945; III, 3804
Compton Creek, N. J., improvement ... I, 371; II, 2197
Conecuh River, Ala., improvement ... I, 845; II, 2506
Coney Island Channel, New York Harbor, N. Y., improvement ... I, 306; II, 2155
Congaree River, S. C.:
    Examination ... I, 677
    Improvement ... I, 663; II, 2396
    Operating and care of lock and dam ... I, 666; II, 2399
Congresses of Navigation, permanent International Association of ... I, 1873
Conneaut Harbor, Ohio, improvement ... I, 1604; II, 3275
Connecticut River, Mass. and Conn.:
    Improvement above Hartford, Conn ... I, 190; II, 2075
    Improvement below Hartford, Conn ... I, 192; II, 2076
Constable Hook to Ellis Island, New York Harbor, examination and survey ... I, 378
Contentnea Creek, N. C., improvement ... I, 605; II, 2353
Contingencies, Engineer Department, Philippine Islands ... I, 62
Contingencies of rivers and harbors, estimate of appropriation ... I, 1877
Continuing contracts:
    Appropriations, estimate ... I, 79
    Delaware River, Pa. and N. J., Philadelphia to the sea ... I, 385; II, 2205
    Estimate of appropriations for ... I, 79
    Hudson River, N. Y ... I, 267; II, 2132
    Key West Harbor, Fla ... I, 760; II, 2447
    Milwaukee Harbor, Wis ... I, 1431; II, 3120
    Sacramento River, flood control ... I, 1860; III, 3445
    South Haven Harbor, Mich ... I, 1485; II, 3159
Controller Bay, Alaska, examination ... I, 1839
Cooper River (Creek), N. J., improvement ... I, 400; II, 2225
Cooper River, S. C., examination and survey ... I, 677
Coosa River, Ga. and Ala.:
    Examination and survey ... I, 864
    Improvement ... I, 856; II, 2514
    Operating and care of locks and dams ... I, 863; II, 2517
    Reexamination ... I, 864
Coos Bay, Harbor, and River, Oreg.:
    Examinations and surveys ... I, 1761, 1762
    Improvement of entrance to bay and harbor ... I, 1723; III, 3354
    Improvement of river ... I, 1727; III, 3357
Coquille River, Oreg., improvement ... I, 1719; III, 3351
Corea Harbor, Me., examination ... I, 103
Core Creek, N. C., improvement of waterway via ... I, 611; II, 2357
Core Sound, N. C., improvement of waterway to Beaufort Harbor ... I, 617; II, 2362
Corney Bayou, La., improvement ... I, 1105; II, 2691
Corozal, Canal Zone, engineer depot ... I, 70
Corps of Engineers:
    Duties ... I, 3
    Increase in, provided by act of June 3, 1916 ... I, 7
    Laws of the Sixty-fifth Congress, first session, affecting the ... III, 3859
    Officers on duty in Office of the Chief of Engineers ... I, 1997
    Personnel—
        Commissioned, number, distribution, and changes during the year ... I, 3
        Engineer Enlisted Reserve Corps ... I, 10
        Engineer officers, National Army ... I, 11
        Engineer Officer's Reserve Corps ... I, 8
        Engineer Officers' training camps ... I, 28
        Engineer troops ... I, 6

X

Col
Con
Con

re Bay and River, Pa., N. J., and Del.: Page.
akwater and harbor of refuge in bay, improvement ------ I, 398; II, 2223
fenses ------ I, 34
provement of river at Trenton ------ I, 379; II, 2201
provement of river, Philadelphia to the sea ------ I, 385; II, 2205
provement of river, Philadelphia to Trenton ------ I, 382; II, 2203
wes, Del., iron pier near, improvement ------ I, 396; II, 2222
rcus Hook, Pa., improvement of ice harbor ------ I, 395; II, 2222
iladelphia and Camden Harbors, improvement ------ I, 382; II, 2203
aterway to Chincoteague Bay, improvement ------ I, 455; II, 2253
aterway to Rehoboth Bay, improvement ------ I, 452; II, 2251
tments, executive, Washington, D. C., telegraph line ------ I, 1940: III, 3790
e, Wis., improvement of Green Bay Harbor ------ I, 1400; II, 3103
s, engineer ------ I, 63–71
cts. *See* Wrecks.
annes Bayou, La.:
xamination and survey ------ I, 986
nprovement ------ I, 973; II, 2613
laises Bayou, La., examination ------ I, 986
Moines Rapids Canal and Dry Dock, Mississippi River, operating
care ------ I, 1171; II, 2771
it, Mich., engineering district ------ I, 1527; II, 3199
it River, Mich.:
xamination and survey of Livingstone Channel ------ I, 1571
Improvement ------ I, 1542; II, 3209
Improvement of channels in waters connecting Great Lakes ------ I, 1527; II, 3199
tor General of Military Railways ------ I, 73
inson Bayou, Tex., improvement ------ I, 1022; II, 2640
al Swamp Canal, Va. and N. C., improvement of waterway via ------ I, 567; II, 2327
rict of Columbia:
Anacostia River, reclamation of flats ------ I, 1904; III, 3755
Aqueduct Bridge across Potomac River, repair ------ I, 1909
Aqueduct, filtration plant ------ I, 1916; III, 3759
Aqueduct, maintenance and repair ------ I, 1916; III, 3759
Armory, commission of ------ I, 1943; III, 3802
Engineer depots ------ I, 63–71
Engineer post and school, buildings for ------ I, 75
Executive Mansion and Office ------ I, 1924; III, 3773
Highway Bridge, Potomac River ------ I, 1922; III, 3773
Improvement of Anacostia River ------ I, 511; II, 2290
Improvement of Potomac River ------ I, 507; II, 2287
Key Bridge, Potomac River ------ I, 1912
Public buildings and grounds, and Washington Monument ------ I, 1922; III, 3773
Telegraph line, connecting executive departments ------ I, 1940; III, 3790
oboy Bar, Ga., improvement ------ I, 706; II, 2416
ock lines, establishment ------ I, 1888
og Island Harbor, St. George Sound, Fla., improvement ------ I, 812; II, 2479
og River, Miss., improvement ------ I, 886; II, 2542
olphins, permits for erection of ------ I, 1886
orcheat Bayou, La., examination ------ I, 1127
Dorchester Bay, Mass., improvement ------ I, 135; II, 2041
Double Bayou, Tex., improvement ------ I, 1010; II, 2635
Drawbridges:
See also Bridges.
Rules for opening ------ I, 1879
Drawings. *See* Maps and Charts.
Drift, removal from New York Harbor ------ I, 312; II, 2157
Duck Creek (Smyrna River), Del., improvement ------ I, 437; II, 2244
Duck Island Harbor, Conn., construction of harbor of refuge ------ I, 196; II, 2078
Duluth, Minn.:
Engineering district ------ I, 1858; II, 3
Examination and survey of harbor ------ I, 1
Improvement of Duluth-Superior Harbor ------ I, 1363; II, 3
Dunkirk Harbor, N. Y., improvement ------ I, 1613; II, 3
Dunns Creek and Crescent Lake, Fla., improvement ------ I, 744

- Corps of Engineers—Continued.
  - Personnel—Continued. Page.
    - Mobilization camps ---- I, 17
    - National Army Engineer troops ---- I, 12
    - New organizations ---- I, 17
    - Recruiting of Engineer enlisted ---- I, 30
    - Retired officers on active duty ---- I, 5
    - Special Enlisted Reserve Corps ---- I, 10
    - Summary ---- I, 16
    - Temporary officers ---- I, 5
- Corpus Christi to Galveston, Tex., waterway:
  - Aransas Pass—Corpus Christi Channel ---- I, 1042; II, 2647
  - Brazos River—Matagorda Bay Channel ---- I, 1033; II, 2644
  - Examination and survey of channel to Aransas Pass ---- I, 1056
  - Guadalupe River to Victoria, Tex ---- I, 1035; II, 2645
  - Pass Cavallo—Aransas Pass Channel ---- I, 1039; II, 2646
  - West Galveston Bay—Brazos River Canal ---- I, 1030; II, 2642
- Corsica River, Md., improvement ---- I, 471; II, 2265
- Cote Blanche Bay, La., improvement of waterway via ---- I, 958; II, 2604
- Cottonwood River, Kans., examination for flood control ---- I, 1162
- Courtableau Bayou, La., examinations and survey ---- I, 985, 986
- Cowhead River, Ga., improvement ---- I, 703; II, 2415
- Cowlitz River, Wash.:
  - Examination and surveys ---- I, 1794
  - Improvement ---- I, 1786; III, 3395
- Crater Lake National Park, Oreg., improvement ---- I, 1982; III, 3839
- Craven Shoal, New York Harbor, improvement ---- I, 300; II, 2151
- Crescent Lake and Dunns Creek, Fla., improvement ---- I, 744; II, 2438
- Crisfield Harbor, Md., improvement ---- I, 499; II, 2282
- Croatan Sound, N. C., improvement of waterway via ---- I, 567; II, 2327
- Crystal River, Fla., improvement ---- I, 783; II, 2462
- Cuba, defenses of Guantanamo Bay ---- I, 52
- Cumberland River, Ky. and Tenn.:
  - Above Nashville, improvement ---- I, 1248; II, 2848
  - Below Nashville, improvement ---- I, 1243; II, 2837
  - Operating and care of locks and dams ---- I, 1253; II, 2851
- Cumberland Sound, Ga. and Fla.:
  - Improvement ---- I, 728; II, 2424
  - Improvement of waterway between Savannah and Fernandina ---- I, 696; II, 2413
  - Improvement of waterways to St. Johns River, Fla ---- I, 700; II, 2414
- Current River, Ark. and Mo., improvement ---- I, 1142; II, 2716
- Curtis Bay, Baltimore, Md., improvement of channel to ---- I, 460; II, 2255
- Cuyahoga River, Cleveland, Ohio, improvement ---- I, 1591; II, 3270
- Cypress Bayou, Tex. and La.:
  - Construction of dam at foot of Caddo Lake ---- I, 1082; II, 2675
  - Improvement of, including connecting lakes between Shreveport, La. and Jefferson, Tex ---- I, 1082; II, 2675
  - Operating and care of dam at foot of Caddo Lake ---- I, 1086; II, 2676
- Cypress Top Outlet, Choctawhatchee River, Fla., improvement ---- I, 836; II, 2498

D.

- Dallas, Tex., engineering district ---- I, 1057; II, 2655
- Dalles-Celilo Canal, Oreg. and Wash.:
  - Improvement ---- I, 1748; III, 3366
  - Operating and care ---- I, 1760; III, 3373
- Dams, permits for erection of ---- I, 1886
- D'Arbonne Bayou, La., improvement ---- I, 1105; II, 2691
- Darien Harbor, Ga., improvement ---- I, 706; II, 2416
- Days Creek and Sulphur River, Tex. and Ark., examination and survey ---- I, 1087
- Deal Island, Md., improvement of lower thoroughfare at Wenona ---- I, 498; II, 2281
- Débris, mine in California ---- I, 1852; III, 3445
- Deep Bay, N. C., improvement of waterway to Swan Quarter Bay ---- I, 587; II, 2341
- Deep Creek Branch, Elizabeth River, Va., improvement of waterway via ---- I, 567; II, 2327
- Defenses, sea coast ---- I, 34

Delaware Bay and River, Pa., N. J., and Del.: Page.
Breakwater and harbor of refuge in bay, improvement ...... I, 398; II, 2223
Defenses ...... I, 34
Improvement of river at Trenton ...... I, 379; II, 2201
Improvement of river, Philadelphia to the sea ...... I, 385; II, 2205
Improvement of river, Philadelphia to Trenton ...... I, 382; II, 2203
Lewes, Del., iron pier near, improvement ...... I, 396; II, 2222
Marcus Hook, Pa., improvement of ice harbor ...... I, 395; II, 2222
Philadelphia and Camden Harbors, improvement ...... I, 382; II, 2203
Waterway to Chincoteague Bay, improvement ...... I, 455; II, 2253
Waterway to Rehoboth Bay, improvement ...... I, 452; II, 2251
Departments, executive, Washington, D. C., telegraph line ...... I, 1940; III, 3799
Depere, Wis., improvement of Green Bay Harbor ...... I, 1400; II, 3103
Depots, engineer ...... I, 63–71
Derelicts. *See* Wrecks.
Des Cannes Bayou, La.:
Examination and survey ...... I, 986
Improvement ...... I, 973; II, 2613
Des Glaises Bayou, La., examination ...... I, 986
Des Moines Rapids Canal and Dry Dock, Mississippi River, operating and care ...... I, 1171; II, 2771
Detroit, Mich., engineering district ...... I, 1527; II, 3199
Detroit River, Mich.:
Examination and survey of Livingstone Channel ...... I, 1571
Improvement ...... I, 1542; II, 3209
Improvement of channels in waters connecting Great Lakes ...... I, 1527; II, 3199
Director General of Military Railways ...... I, 73
Dickinson Bayou, Tex., improvement ...... I, 1022; II, 2640
Dismal Swamp Canal, Va. and N. C., improvement of waterway via ...... I, 567; II, 2327
District of Columbia:
Anacostia River, reclamation of flats ...... I, 1904; III, 3755
Aqueduct Bridge across Potomac River, repair ...... I, 1909
Aqueduct, filtration plant ...... I, 1916; III, 3759
Aqueduct, maintenance and repair ...... I, 1916; III, 3759
Armory, commission of ...... I, 1943; III, 3802
Engineer depots ...... I, 63–71
Engineer post and school, buildings for ...... I, 75
Executive Mansion and Office ...... I, 1924; III, 3773
Highway Bridge, Potomac River ...... I, 1922; III, 3773
Improvement of Anacostia River ...... I, 511; II, 2290
Improvement of Potomac River ...... I, 507; II, 2287
Key Bridge, Potomac River ...... I, 1912
Public buildings and grounds, and Washington Monument ...... I, 1922; III, 3773
Telegraph line, connecting executive departments ...... I, 1940; III, 3799
Doboy Bar, Ga., improvement ...... I, 706; II, 2416
Dock lines, establishment ...... I, 1888
Dog Island Harbor, St. George Sound, Fla., improvement ...... I, 812; II, 2479
Dog River, Miss., improvement ...... I, 886; II, 2542
Dolphins, permits for erection of ...... I, 1886
Dorcheat Bayou, La., examination ...... I, 1127
Dorchester Bay, Mass., improvement ...... I, 135; II, 2041
Double Bayou, Tex., improvement ...... I, 1010; II, 2635
Drawbridges:
See also Bridges.
Rules for opening ...... I, 1879
Drawings. *See* Maps and Charts.
Drift, removal from New York Harbor ...... I, 312; II, 2157
Duck Creek (Smyrna River), Del., improvement ...... I, 437; II, 2244
Duck Island Harbor, Conn., construction of harbor of refuge ...... I, 196; II, 2078
Duluth, Minn.:
Engineering district ...... I, 1358; II, 3077
Examination and survey of harbor ...... I, 1391
Improvement of Duluth-Superior Harbor ...... I, 1363; II, 3080
Dunkirk Harbor, N. Y., improvement ...... I, 1613; II, 3283
Dunns Creek and Crescent Lake, Fla., improvement ...... I, 744; II, 2438

E.

Page.

- East Bay Bayou, Tex., improvement — I, 1008; II, 2635
- East Bay, Fla., improvement of waterways via — I, 829; II, 2486
- East (Ambrose) Channel, New York Harbor, N. Y., improvement — I, 300; II, 2151
- East Chester Creek, N. Y., improvement — I, 238; II, 2140
- East Coast Canal, St. Johns River to Key West, Fla., examination — I, 512
- Eastern Bay, Claiborne Harbor, Md., improvement — I, 474; II, 2257
- Eastern Branch (Anacostia River), D. C., improvement — I, 511; II, 2260
- Eastern Branch, Elizabeth River, Va., improvement — I, 538; II, 2309
- Eastern entrance to Long Island Sound, defenses — I, 34
- East Norwalk Harbor, Conn., improvement — I, 219; II, 2130
- East Pass, Carrabelle Harbor, Fla., improvement — I, 812; II, 2479
- East Pearl River, Miss., improvement — I, 905; II, 2553
- East River, Brunswick Harbor, Ga., improvement — I, 724; II, 2425
- East River, N. Y., improvement, including Coenties Reef — I, 249; II, 2165
- Echo Bay Harbor, New Rochelle, N. Y., improvement — I, 236; II, 2140
- Echo Bay, N. Y., examination and survey — I, 294
- Electrical power:
  - Mississippi River between St. Paul and Minneapolis, Minn — I, 1182; II, 2781
  - Niagara River, N. Y., control and regulation — I, 1969; III, 3821
  - Tennessee River, Elk River Shoals to Florence, Ala — I, 1290; II, 2880
- Elizabeth River, N. J., improvement — I, 352; II, 2186
- Elizabeth River, Va.:
  - Improvement of Norfolk Harbor, including Eastern, Southern, and Western Branches — I, 538; II, 2309
  - Improvement of waterway to sounds of North Carolina via Pasquotank River — I, 567; II, 2327
- Elk River, Md.:
  - Examination and survey — I, 506
  - Improvement — I, 466; II, 2261
- Elk River Shoals Canal, Ala., operating and care — I, 1290; II, 2880
- El Paso, Tex., engineer depot — I, 69
- Embankments and sea walls — I, 46
- Emplacements, modernizing — I, 42
- Employees, civilian assistants to Engineer officers — I, 63
- Employees, civilian, Office of the Chief of Engineers — I, 33
- Endicott Board — I, 34
- Enfield Rapids, Connecticut River, Conn., improvement — I, 190; II, 2075
- Engineer Department, Philippine Islands, contingencies — I, 62
- Engineer depots — I, 63-71
- Engineer Enlisted Reserve Corps — I, 10
- Engineer officers, civilian assistants to — I, 63
- Engineer officers, National Army — I, 11
- Engineer Officers' Reserve Corps — I, 8
- Engineer officers' training camps — I, 28
- Engineer operations in the field — I, 72
- Engineer Post and School, Washington, D. C., buildings — I, 75
- Engineer School, Washington Barracks, D. C — I, 73
- Engineers, National Army — I, 11
- Engineers, Office of the Chief of, officers on duty — I, 1997
- Engineers, The Board of — I, 33
- Engineer troops:
  - Distribution and commissioned strength — I, 6
  - Enlisted Reserve Corps — I, 10
  - Equipment of — I, 71
  - Gas Defense and Tank Service — I, 14
  - Increase of companies to maximum strength — I, 7
  - Mobilization camps — I, 17
  - National Army — I, 11, 12
  - National Guard organizations — I, 7
  - New engineer organizations — I, 17
  - Recruiting — I, 30
  - Reorganization of regiments and battalions — I, 6
  - Replacement of casualties — I, 32
  - Special — I, 13
  - Training — I, 31

Page.

- English Kills, Newtown Creek, N. Y., improvement — I, 315; II, 2160
- Enlisted Reserve Corps — I, 10
- Equipment, engineer, of troops — I, 71
- Erie Basin, N. Y., improvement of channel in Lake Erie — I, 1621; II, 3290
- Erie Harbor, Pa., improvement — I, 1609; II, 3279
- Erie Lake:
  - Black Rock Harbor, improvement of entrance to — I, 1621; II, 3290
  - Channels in waters connecting Great Lakes, improvement — I, 1527; II, 3199
  - Examination of harbors and connecting waters of Great Lakes — I, 1654
  - Surveys, charts, etc., of northern and norwestern lakes — I, 1956; III, 3809
  - Water levels — I, 1956; III, 3809
  - Waterway to Lake Michigan, examination — I, 1608
  - Waterway to Lake Ontario, examination — I, 1655
- Escambia River, Fla., improvement — I, 845; II, 2506
- Estherville-Minim Creek Canal, S. C., improvement — I, 659; II, 2394
- Estimates of appropriations required:
  - Civilian assistants to Engineer officers — I, 63
  - Contingencies, Engineer Department, Philippine Islands — I, 63
  - Engineer depots — I, 71
  - Engineer equipment of troops — I, 71
  - Engineer operations in the field — I, 73
  - Examinations, surveys, and contingencies — I, 1877
  - Fortifications — I, 52, 57
  - Maps, War Department — I, 60
  - Military surveys and maps — I, 62
  - Miscellaneous civil works — I, 1892
  - Panama Canal — I, 58
  - Rivers and harbors, etc — I, 79
  - Roads in insular possessions — I, 57
- Eureka, Cal., improvement of channel in front of — I, 1693; III, 3337
- Evanston, Ill., harbor of refuge, examination — I, 1480
- Everett Harbor, Wash.:
  - Examination and survey — I, 1839
  - Improvement — I, 1820; III, 3423
- Examination of rivers and harbors, estimate of appropriation for — I, 1877
- Executive departments, Washington, D. C., telegraph line — I, 1940; III, 3799
- Executive Mansion and Office, Washington, D. C., maintenance and repair of — I, 1924; III, 3773
- Expenditures:
  - Fortifications — I, 42
  - Rivers and harbors — I, 77
- Experimental towboats, board on — I, 1873; III, 3455

F.

- Fairhaven Harbor, Mass., improvement — I, 154; II, 2051
- Fairport Harbor, Ohio, improvement — I, 1597; II, 3272
- Falia, Bogue, La., improvement — I, 925; II, 2582
- Fall River, Harbor, Mass., improvement — I, 157; II, 2054
- Falls of Ohio River, Louisville, Ky., improvement — I, 1292; II, 2885
- Fancy Bluff Creek, Ga., improvement — I, 708; II, 2417
- Feather River, Cal.:
  - Improvement — I, 1715; II, 3348
  - Work of California Débris Commission — I, 1860; III, 3445
- Fernandina Harbor, Fla.:
  - Improvement — I, 728; II, 2424
  - Improvement of waterway to Savannah, Ga — I, 696; II, 2413
- Fighting Island Channel, Detroit River, Mich., improvement — I, 1542; II, 3200
- Filtration plant, Washington Aqueduct, D. C — I, 1916; III, 3759
- Fine Arts Commission — I, 1943; III, 3802
- Fire control at fortifications — I, 43
- Fishing Creek, N. C., improvement — I, 592; II, 2344
- Fish traps, or wiers, permits for construction — I, 1886
- Fivemile River Harbor, Conn., improvement — I, [illegible]; II, [illegible]
- Flathead Lake and River, Mont., improvement of Polson Bay — I, 1832; III, 3431

Page
Flint River, Ga.:
  Examinations and surveys i, 731, 864
  Improvement i, 823; ii, 2487
Floating plant, statement of i, 1877; iii, 3945
Flood control:
  In State of Kansas, examination for i, 1162
  On Mississippi River i, 1866; iii, 3433
  On Red River, examination for i, 1162
  On Sacramento River, Cal i, 1860; iii, 3445
Florence, Ala., engineering district i, 1286; ii, 2879
Florida:
  Examination of East Coast Canal i, 811
  Removal of water hyacinths from waters of State i, 807; ii, 2476
  Waterway along Gulf coast of, connecting St. George Sound with Tampa Bay, examination and survey i, 819
Flushing Bay and Creek, N. Y.:
  Examination and survey i, 338
  Improvement i, 317; ii, 2162
Fore (Weymouth) River, Mass., improvement i, 138; ii, 2035
Fore River, Portland, Me., improvement i, 96; ii, 2021
Forked Deer River, Tenn., examination i, 1255
Fort George River, Fla., improvement of waterway via i, 700; ii, 2414
Fortifications:
  Antiaircraft defense i, 38
  Appropriations i, 42
  Artillery fire at long ranges i, 37
  Barrage fire i, 38
  Batteries i, 42
  Batteries in insular possessions i, 52
  Board of Engineers, The i, 33
  Board on Fortifications or other Defenses (Endicott Board) i, 34
  Electrical and other supplies, insular possessions i, 54
  Electrical installations i, 44
  Electrical installations, insular possessions i, 52
  Estimates of appropriations required i, 52
  Estimates of appropriations required, insular possessions i, 57
  Fire control i, 43
  Fire control, insular possessions i, 55
  General statement and progress of work i, 34
  Isthmian Canal i, 58
  Land defense i, 42
  Land defenses, insular possessions i, 54
  Mine-defense structures, insular possessions i, 55
  Modernizing older emplacements i, 42
  National Coast Defense Board i, 34
  Panama Canal i, 58
  Plans i, 45
  Preservation and repair i, 44
  Preservation and repair, insular possessions i, 53
  Preservation and repair of torpedo structures i, 45
  Projects i, 34
  Reserve equipment, insular possessions i, 54
  Roads, trails, etc i, 48
  Sandy Hook Reservation, N. J., protection of i, 47
  Seacoast, contingent expenses i, 49
  Searchlights i, 44
  Searchlights, insular possessions i, 53
  Sea walls—
    Defenses of Galveston, Tex i, 48
    Embankments and i, 46
    In Hawaiian Islands i, 55
  Sites i, 44
  Sites, insular possessions i, 53
  Submarine mines i, 49
  Supplies for seacoast defenses i, 46
Fort Leavenworth, Kans., engineer depot i, 63
Fort Pierre, S. Dak., improvement of Missouri River at i, 1226; ii, 2823

Page.

Fort Point Channel, Boston Harbor, Mass., improvement — I, 111; II, 2020
Fort Riley Military Reservation, Kans., protection of bank line of Republican River in front of — I, 1241; II, 2836
Fort Sam Houston, Tex., engineer depot — I, 69
Fox River, Wis.:
  Improvement — I, 1404; II, 3105
  Improvement of Green Bay Harbor — I, 1400; II, 3103
  Operating and care of locks and dams — I, 1447; II, 3129
  Reexamination — I, 1447
Foys Flats, N. C., examination of Trent River at — I, 647
Frankfort Harbor, Mich., improvement — I, 1516; II, 3188
Franklin, La.:
  Improvement of waterway to Mermentau — I, 958; II, 2604
  Operating and care of Schooner Bayou Lock — I, 968; II, 2609
Freeport Harbor, Tex., improvement — I, 1045; II, 2648
French Broad River, Tenn., improvement — I, 1277; II, 2876
Front River, Ga.:
  Examination — I, 730
  Improvement of Sapelo Harbor — I, 704; II, 2415

G.

Gaging:
  Mississippi River and principal tributaries — I, 1196; II, 2787
  Northern and northwestern lakes, level — I, 1956; III, 3809
Galena River, Ill.:
  Operating and care of lock and dam — I, 1175; II, 2776
  Operating snag and dredge boats — I, 1173; II, 2774
Galveston and Sabine section of Inland Waterway, Tex., examination and survey — I, 1056
Galveston Bay and Harbor, Tex.:
  Examinations and surveys — I, 1055, 1056
  Improvement of channel across Hanna Reef, Ladies Pass — I, 1008; II, 2635
  Improvement of Galveston Channel — I, 990; II, 2622
  Improvement of Galveston-Texas City Channel — I, 996; II, 2628
  Improvement of harbor entrance — I, 987; II, 2621
  Improvement of Port Bolivar Channel — I, 999; II, 2630
  Improvement of waterway to Houston — I, 1002; II, 2631
  Improvement of West Bay — I, 1030; II, 2642
Galveston Island and Galveston Channel, Tex., survey — I, 1056
Galveston, Tex.:
  Defenses — I, 34
  Engineering district — I, 987; II, 2621
  Sea walls — I, 48
Galveston to Corpus Christi, Tex., waterway:
  Aransas Pass-Corpus Christi Channel — I, 1042; II, 2647
  Brazos River-Matagorda Bay Channel — I, 1033; II, 2644
  Guadalupe River to Victoria, Tex — I, 1035; II, 2645
  Pass Cavallo-Aransas Pass Channel — I, 1039; II, 2646
  West Galveston Bay-Brazos River Canal — I, 1030; II, 2642
Gardiners Island, N. Y., examination for breakwater — I, 338
Gasconade River, Mo., improvement — I, 1236; II, 2832
Gedney Channel, New York Harbor, N. Y., improvement — I, 300; II, 2151
Genesee River, Charlotte Harbor, N. Y., improvement — I, 1634; II, 3302
George, Lake, channels in waters connecting Great Lakes, improvement — I, 1527; II, 3199
George, Lake, St. Johns River, Fla., improvement — I, 741; II, 2436
Georges River, Me., improvement — I, 91; II, 2009
Georgetown Harbor, D. C.:
  Improvement of Potomac River at — I, 507; II, 2287
  Key Bridge across Potomac River at — I, 1912
Georgetown Harbor, S. C., improvement — I, 648; II, 2387
Germantown, Pa., memorial monument — I, 1994
Glaises, des, Bayou, La., examination — I, 936
Gloucester Harbor, Mass., improvement — I, 120; II, 2029

Page.

- Government telegraph line, Washington, D. C. ... I, 1940; III, 3799
- Gowanus Creek Channel, New York Harbor, N. Y., improvement ... I, 310; II, 2157
- Grand Calumet River, Ill. and Ind., improvement ... I, 1459; II, 3139
- Grand Haven Harbor, Mich., improvement ... I, 1494; II, 3166
- Grand Lake, Mermentau River, La., improvement ... I, 971; II, 2613
- Grand Marais, Mich., improvement of harbor of refuge ... I, 1388; II, 3094
- Grand Marais, Minn., improvement of harbor ... I, 1358; II, 3077
- Grand Rapids, Mich., engineering district ... I, 1480; II, 3155
- Grand Rapids, Wabash River, lock and dam, operating and care ... I, 1337; II, 3033
- Grand River, Fairport Harbor, Ohio, improvement ... I, 1597; III, 3372
- Grand River, La., improvement ... I, 942; II, 2592
- Grand River, Mich.:
  - Improvement ... I, 1497; II, 3172
  - Improvement of Grand Haven Harbor ... I, 1494; II, 3166
- Grants Pass, Ala., improvement of waterway via ... I, 869; II, 2525
- Grays Harbor, Wash.:
  - Improvement between Aberdeen and the entrance ... I, 1802; III, 3406
  - Improvement of entrance ... I, 1798; III, 3404
- Grays River, Wash., improvement ... I, 1789; III, 3397
- Great Lakes:
  - Channels in waters connecting, improvement ... I, 1527; II, 3199
  - Commercial statistics, Sault Ste. Marie Canals, Mich ... I, 1547; II, 3219
  - Control and regulation of waters of Niagara River and preservation of Niagara Falls ... I, 1969; III, 3821
  - Examination of harbors and connecting waters of ... I, 1654
  - Surveys, charts, etc., of northern and northwestern lakes ... I, 1956; III, 3809
  - Water levels ... I, 1956; III, 3809
- Great Lakes, Ill., examination and survey of bar in Lake Michigan at ... I, 1480
- Great Peedee River, S. C., improvement ... I, 656; II, 2393
- Great Salt Pond, Block Island, R. I., improvement ... I, 175; II, 2065
- Great Sodus Bay, N. Y., improvement of harbor ... I, 1639; II, 3305
- Great South Bay, N. Y.:
  - Examination and survey of channel to Peconic Bay ... I, 338
  - Improvement ... I, 334; II, 2171
- Green Bay Harbor, Wis., improvement ... I, 1400; II, 3103
- Green Jacket Shoal, Providence River, R. I., removal ... I, 164; II, 2059
- Green River, Ky., operating and care of locks and dams ... I, 1341; II, 3035
- Greenwich Harbor, Conn., improvement ... I, 226; II, 2093
- Greenwood Lake, N. J., examination ... I, 377
- Grossetete Bayou, La., improvement ... I, 946; II, 2594
- Grounds, public, District of Columbia ... I, 1922; III, 3773
- Guadalupe River, Tex., improvement from Victoria to Aransas Pass—Pass Cavallo Channel ... I, 1035; II, 2645
- Guantanamo Bay, Cuba, defenses of ... I, 52
- Gulfport Harbor, Miss., improvement of channel to Ship Island Harbor ... I, 880; II, 2544
- Gull Lake, Minn., reservoir dam:
  - Construction ... I, 1191; II, 2785
  - Operating and care ... I, 1196; II, 2786
- Gun batteries ... I, 42
- Gunnisons Cut, improvement of waterway via ... I, 700; II, 2414

H.

- Hackensack, River, N. J.:
  - Examination and surveys ... I, 377
  - Improvement ... I, 345; II, 2181
- Hales Bar lock and dam, Tennessee River, operating and care ... I, 1275; II, 2873
- Halifax River, Fla., examination and survey ... I, 812
- Hampton Roads, Va.:
  - Defenses ... I, 34
  - Improvement of approaches to Norfolk Harbor ... I, 538; II, 2309
- Hanna Reef, Ladies Pass, Tex., improvement of channel ... I, 1008; II, 2635
- Hanson Canal, improvement of waterway via ... I, 958; II, 2604
- Harbor Beach, Mich., harbor of refuge, improvement ... I, 1559; II, 3249

Page.
Harbor Cove, Gloucester, Mass., improvement I, 120; II, 2029
Harbor Island and Port Aransas, Tex., to Rockport, examination and survey of channel I, 1056
Harbor Island Harbor, Tex., improvement I, 1051; II, 2051
Harbor lines, establishment I, 1888
Harbors and rivers. *See* Rivers and harbors.
Harlem (Bronx) Kills, N. Y.:
  Examination and survey I, 299
  Improvement I, 257; II, 2117
Harlem River, N. Y.:
  Examination and survey I, 299
  Improvement I, 257; II, 2117
Harris County, Houston ship channel navigation district, contribution of funds for Galveston-Houston Channel, Tex I, 1003; II, 2631
Hat Slough, Puget Sound, Wash., construction of dike at I, 1806; III, 3407
Havre de Grace, Md., improvement of Susquehanna River at I, 465; II, 2259
Hawaiian Islands:
  Defenses I. 52
  Hilo Harbor, improvement I, 1845; III, 3437
  Honolulu Harbor, improvement I, 1839; III, 3433
  Kahului Harbor, improvement I, 1842; III, 3435
  Sea walls I, 55
Hawaii engineering district I, 1839; III, 3433
Hayden Slough, Oreg., examination I, 1794
Hay Lake Channel, St. Marys River, Mich.:
  Improvement I, 1527; II, 3199
  Improvement of channels in waters connecting Great Lakes I, 1527; II, 3199
Hell Gate, East River, N. Y., improvement I, 249; II, 2105
Hempstead Harbor (north shore of Long Island), N. Y., improvement I, 320; II, 2163
Hennepin Canal (Illinois and Mississippi Canal), Ill.:
  Improvement I, 1176; II, 2777
  Operating and care I, 1177; II, 2778
Hereford Inlet, N. J., examination I, 459
Highway bridges, Potomac River, Washington, D. C.:
  Aqueduct Bridge, repairs I, 1909
  Highway Bridge, repairs I, 1922; III, 3799
  Key Bridge, construction I, 1912
Highways. *See* Roads.
Hillsboro Bay and River, Fla.:
  Examination and survey of river I, 812
  Improvement of bay I, 794; II, 2468
  Improvement of river I, 799; II, 2471
Hilo Harbor, Hawaii, improvement I, 1845; III, 3437
Hiawassee River, Tenn., improvement I, 1283; II, 2878
Holland Harbor, Mich., improvement I, 1491; II, 3163
Holmes River, Fla., improvement I, 839; II, 2500
Honolulu, Hawaii:
  Defenses I, 52
  Engineer depot I, 70
  Engineering district I, 1839; III, 3433
  Improvement of harbor I, 1839; III, 3433
Hoquarten Slough, Tillamook Bay, Oreg.:
  Examinations and surveys I, 1762
  Improvement I, 1737; III, 3369
Hoquiam River, Wash., improvement I, 1804; III, 3406
Horn Island Harbor and Pass, Miss., improvement I, 886; II, 2542
Horseshoe Battle Ground, Ala., monument at I, 1996
Hospital Point, Norfolk Harbor, Va., removal I, 538; II, 2309
Housatonic River, Conn., improvement I, 208; II, 2084
Houston to Galveston ship channel, Tex.:
  Examination and survey I, 1056
  Examination and survey of channel to Goose Creek oil field I, 1056
  Improvement I, 1002; II, 2631

Page

- Hudson River, N. Y.:
  - Examinations and surveys .... I, 290
  - Improvement above New York .... I, 267; II, 2132
  - Improvement at New York .... I, 262; II, 2122
  - Peekskill Harbor, improvement .... I, 277; II, 2139
  - Rondout Harbor, improvement .... I, 284; II, 2145
  - Saugerties Harbor, improvement .... I, 281; II, 2144
  - Tarrytown Harbor, improvement .... I, 274; II, 2138
  - Troy lock and dam, operating and care .... I, 273; II, 2136
- Humboldt Bay and Harbor, Cal.:
  - Examinations and surveys .... I, 1697
  - Improvement .... I, 1693; III, 3337
- Huntington Harbor, N. Y., improvement .... I, 322; II, 2164
- Huron Harbor, Ohio, improvement .... I, 1582; II, 3264
- Huron Lake:
  - Channels in waters connecting Great Lakes, improvement .... I, 1527; II, 3199
  - Examination of harbors and connecting waters of Great Lakes .... I, 1654
  - Surveys, charts, etc .... I, 1956; III, 3809
  - Water levels .... I, 1956; III, 3809
- Hutchinson River (East Chester Creek), N. Y., improvement .... I, 238; II, 2100
- Hyacinths, water, removal:
  - From Alabama, Mississippi, Louisiana, and Texas, waters .... I, 983; II, 2619
  - From Florida waters .... I, 807; II, 2476
- Hydraulic mining in California .... I, 1853; III, 3445
- Hydraulics. *See* Water levels.
- Hydrology. *See* Water levels.

I.

- Illinois & Michigan Canal, war-emergency work .... I, 1477; II, 3153
- Illinois & Mississippi Canal, Ill.:
  - Improvement .... I, 1176; II, 2777
  - Operating and care .... I, 1177; II, 2778
- Illinois River, Ill.:
  - Improvement .... I, 1470; II, 3146
  - Operating and care of locks and dams .... I, 1476; II, 3151
  - Operating snag boats and dredge boats .... I, 1173; II, 2774
- Indiana Harbor, Ind., improvement .... I, 1462; II, 3140
- Indian Bayou, Miss., examination and survey .... I, 1127
- Indian River, Fla.:
  - Examination and survey .... I, 812
  - Improvement .... I, 751; II, 2441
- Inland waterways. *See* Canals *and* Waterways.
- Inside routes. *See* Canals *and* Waterways.
- Insular possessions:
  - Defenses .... I, 52
  - Honolulu, Hawaii, engineering district .... I, 1839; III, 3433
  - Porto Rico engineering district .... I, 1848; III, 3441
- International Association of Congresses of Navigation .... I, 1873
- Intracoastal waterways. *See* Canals *and* Waterways.
- Isthmian Canal, fortification .... I, 58
- Istokpoga Creek, Fla., improvement of Kissimmee River .... I, 765; II, 2449

J.

- Jackson, Gen. Andrew, monument at Horseshoe Battle Ground .... I, 1996
- Jackson River, Fla., improvement of waterway via .... I, 829; II, 2493
- Jacksonville, Fla.:
  - Engineering district .... I, 731; II, 2427
  - Improvement of St. Johns River opposite .... I, 736; II, 2432
- Jacksonville, N. C., improvement of waterway to Beaufort .... I, 619; II, 2364
- Jamaica Bay, N. Y.:
  - Examination and survey .... I, 338
  - Improvement .... I, 330; II, 2169
- James River, Va., improvement .... I, 549; II, 2319
- Jefferson-Shreveport Waterway, La. and Tex., improvement .... I, 1062; II, 2675

Page.
Jekyl Creek, Ga., improvement of waterway via ---- I, 696; II, 2413
Johnsons Bayou, La., improvement ---- I, 1067; II, 2666
Johnsons Creek, or River, Conn., improvement ---- I, 211; II, 2085
Jordon River, Miss., improvement ---- I, 902; II, 2550
Judith Point, R. I., construction of harbor of refuge ---- I, 170; II, 2063

K.

Kahului Harbor, Hawaii, improvement ---- I, 1842; III, 3435
Kalamazoo River, Mich., improvement ---- I, 1489; II, 3162
Kampsville Lock and Dam, Illinois River, Ill., operating and care ---- I, 1476; II, 3151
Kanawha River, W. Va., operating and care of locks and dams ---- I, 1330; II, 3011
Kansas City, Mo., engineering district ---- I, 1210; II, 2793
Kansas River, Kans., improvement ---- I, 1230; II, 2827
Kansas, State of, examination for flood control in ---- I, 1162
Kelso Bayou, La., examination ---- I, 985
Kennebec River, Me.:
  Defenses ---- I, 34
  Improvement ---- I, 93; II, 2010
Kenosha Harbor, Wis.:
  Examination and survey ---- I, 1447
  Improvement ---- I, 1440; II, 3126
Kentucky River, Ky.:
  Improvement ---- I, 1353; II, 3065
  Operating and care of locks and dams ---- I, 1356; II, 3069
Keokuk (Des Moines Rapids) Canal and Dry Dock, Mississippi River, operating and care ---- I, 1171; II, 2771
Kewaunee Harbor, Wis., improvement ---- I, 1417; II, 3112
Keweenaw Canal, across Keweenaw Point, Mich. (Keweenaw Bay-Lake Superior waterway), improvement ---- I, 1378; II, 3088
Key Bridge, Potomac River at Georgetown, D. C., construction ---- I, 1912
Key, Francis Scott, monument ---- I, 1944; III, 3804
Keyport Harbor, N. J., improvement ---- I, 367; II, 2194
Keystone Lock, Bayou Teche, La., operating and care ---- I, 954; II, 2600
Key West Harbor, Fla.:
  Defenses ---- I, 34
  Examination and survey of Northwest Channel ---- I, 811
  Examination of Florida East Coast Canal to St. Johns River ---- I, 811
  Improvement ---- I, 760; II, 2447
Kiamichi River, Okla., improvement ---- I, 1078; II, 2678
Kill Van Kull, N. Y. and N. J.:
  Examination ---- I, 378
  Improvement of Staten Island-New Jersey Channels, I, 347, 350; II, 2182, 2186
King County, Wash., improvement of Lake Washington Canal by, I, 1815; III, 3416
Kings Creek, Camden County, Ga., examination ---- I, 730
Kingsley Cut, Fla., improvement of waterway via ---- I, 700; II, 2414
Kinnikinnic River, Wis., improvement of Milwaukee Harbor ---- I, 1431; II, 3120
Kissimmee River, Fla., improvement ---- I, 765; II, 2449

L.

Lacassine Bayou, La., examination and survey ---- I, 986
La Conner, Wash., improvement of Swinomish Slough ---- I, 1824; III, 3426
Lafourche Bayou, La.:
  Examinations and surveys ---- I, 986
  Improvement ---- I, 937; II, 2588
Lagrange Lock and Dam, Illinois River, Ill., operating and care ---- I, 1476; II, 3151
Lake Champlain, improvement of narrows ---- I, 287; II, 2146
Lake of the Woods, Minn., improvement of Zippel Bay ---- I, 1207; II, 2791
Lake Pontchartrain, La., improvement ---- I, 923; II, 2580

Lakes, Great: Page.
  Channels in waters connecting, improvement — I, 1527; II, 3199
  Commercial statistics, Sault Ste. Marie Canals, Mich — I, 1547; II, 3219
  Control and regulation of waters of Niagara River and preservation of Niagara Falls — I, 1969; III, 3821
  Examination of harbors and connecting waters of — I, 1654
  Surveys, charts, etc — I, 1956; III, 3809
  Water levels — I, 1956; III, 3809
Lake survey — I, 1956; III, 3809
Lake Traverse, Minn. and S. Dak., improvement — I, 1201; II, 2789
Lake Washington Canal, Wash.:
  Improvement of waterway to Puget Sound — I, 1815; III, 3416
  Operating and care of waterway to Puget Sound — I, 1831; III, 3429
Lake Washington, Miss., improvement — I, 1122; II, 2703
Lake Worth Inlet, Fla., examination and survey — I, 812
L'Anguille River, Ark., improvement — I, 1145; II, 2718
La Trappe River, Md., improvement — I, 479; II, 2269
Lavaca Bay, Tex., improvement of channel from Pass Cavallo to Port Lavaca — I, 1038; II, 2645
Laws of 65th Congress, 1st session, affecting the Corps of Engineers — III, 3859
Leaf River, Miss., improvement — I, 894; II, 2547
Leavenworth, Fort, Kans., engineer depot — I, 69
Leech Lake Reservoir, Minn.:
  Construction — I, 1191; II, 2785
  Operating and care — I, 1196; II, 2786
Leech River, Minn., improvement, including upper Mississippi River, I, 1188; II, 2783
Lee Slough, Apalachicola River, Fla., improvement — I, 817; II, 2483
Leipsic River, Del., improvement — I, 439; II, 2244
Levels, water. *See* Water levels.
Levisa Fork, Big Sandy River, Ky.:
  Improvement — I, 1349; II, 3061
  Operating and care of locks and dams — I, 1353; II, 3063
Lewes, Del., pier in Delaware Bay near — I, 396; II, 2222
Lewis River, Wash., improvement — I, 1782; III, 3394
Lighthouses, etsablishment of, officers on duty in connection with — I, 4
Little Annemessex River, Md., improvement of Crisfield Harbor — I, 499; II, 2282
Little Calumet River, Ill. and Ind., improvement — I, 1459; II, 3139
Little Elk River, Md., improvement — I, 466; II, 2261
Little Kanawha River, W. Va., operating and care of locks and dams — I, 1327; II, 3005
Little Mud River, Ga., improvement of waterway via — I, 696; II, 2413
Little Narragansett Bay, R. I. and Conn., improvement — I, 178; II, 2069
Little Peedee River, S. C., improvement — I, 654; II, 2392
Little Pigeon River, Tenn., improvement — I, 1277; II, 2876
Little River, Del., improvement — I, 441; II, 2245
Little River, N. C. and S. C., examination — I, 677
Little Rock, Ark., engineering district — I, 1127; II, 2707
Little Sarasota Bay, Fla.:
  Examination — I, 811
  Improvement — I, 776; II, 2457
Little Sodus Bay, N. Y., improvement of harbor — I, 1642; II, 3307
Little Tennessee River, Tenn., examination — I, 1286
Little Wicomico River, Va., examination and survey — I, 537
Live Oak and Caney Creeks, Tex., examination and survey — I, 1056
Livingstone Channel, Detroit River, Mich.:
  Examination and survey — I, 1571
  Improvement — I, 1542; II, 3209
Log booms, permits for construction — I, 1878
Loggy Bayou, La., examination — I, 1127
Long Island Sound, N. Y. and Conn., defenses of eastern entrance — I, 34
Lorain Harbor, Ohio:
  Examination of Black River at — I, 1608
  Improvement — I, 1588; II, 3267

Page.

- Los Angeles, Cal.:
  - Defenses I, 34
  - Engineering district I, 1655; III, 3317
  - Examination and survey I, 1670
  - Improvement of harbor I, 1660; III, 3319
- Louisiana, State of, removal of water hyacinths from I, 983; II, 2619
- Louisville & Portland Canal, Ky.:
  - Enlargement I, 1292; II, 2925
  - Operating and care I, 1306; II, 2968
- Louisville, Ky., engineering district I, 1337; II, 3033
- Lower Cedar Point, Md., improvement of Potomac River at I, 516; II, 2293
- Lower Chipola River, Fla., improvement I, 817; II, 2483
- Lower Thoroughfare, Wenona, Deal Island, Md., improvement I, 498; II, 2281
- Ludington Harbor, Mich., improvement I, 1505; II, 3178
- Lynchs River, S. C., examination I, 677
- Lynn Harbor, Mass., improvement I, 127; II, 2035

M.

- McClellanville, S. C., improvement of waterway to Charleston I, 667; II, 2399
- Macdonough Memorials, Lake Champlain, N. Y. and Vt I, 1993
- Mackinac Harbor, Mich., improvement I, 1548; II, 3243
- Macon Bayou, La., improvement I, 1097; II, 2685
- Main ship channel, New York Harbor, N. Y., improvement I, 300; II, 2151
- Malden River, Mass., improvement I, 133; II, 2040
- Mamaroneck Harbor, N. Y.:
  - Examination and survey I, 299
  - Improvement I, 233; II, 2097
- Manatee River, Fla., improvement I, 801; II, 2473
- Manchac Bayou, La., improvement I, 933; II, 2586
- Manchac Pass, La., improvement I, 928; II, 2584
- Manila, P. I.:
  - Defenses of bay I, 52
  - Engineer depot I, 70
- Manistee Harbor and River, Mich., improvement I, 1509; II, 3183
- Manistique Harbor, Mich., improvement I, 1392; II, 3097
- Manitowoc Harbor, Wis., improvement I, 1422; II, 3115
- Manokin River, Md., improvement I, 496; II, 2280
- Manteo Bay, N. C., improvement I, 585; II, 2339
- Mantua Creek, N. J., improvement I, 404; II, 2227
- Maps and charts:
  - Military surveys and I, 60
  - Northern and northwestern lakes I, 1956; III, 3809
  - War Department maps I, 60
- Marcus Hook, Pa., improvement of ice harbor at I, 395; II, 2221
- Marmotte Bayou, Ala., examination I, 910
- Marquette Bay and Harbor, Mich.:
  - Construction of harbor of refuge in bay I, 1382; II, 3090
  - Improvement of harbor I, 1384; II, 3091
- Marshyhope Creek, Md., improvement I, 488; II, 2275
- Matagorda Bay, Tex.:
  - Improvement of channel from Pass Cavallo to Aransas Pass I, 1039; II, 2646
  - Improvement of channel to Brazos River I, 1033; II, 2644
- Matawan Creek, N. J.:
  - Improvement I, 369; II, 2196
  - Improvement of Keyport Harbor I, 367; II, 2194
- Mattaponi River, Va., improvement I, 530; II, 2301
- Mattituck Harbor, N. Y., improvement I, 326; II, 2167
- Maumee Bay and River, Ohio, improvement of Toledo Harbor I, 1572; II, 3259
- Maurice River, N. J., improvement I, 417; II, 2234
- Meherrin River, N. C., improvement I, 577; II, 2334
- Memorial statues, etc. See Statues, memorials, etc.
- Memphis Harbor, Tenn., improvement by Mississippi River Commission I, 1866; II, 3459
- Menominee Harbor and River, Mich. and Wis., improvement I, 1395; II, 3099

Page.

Menomonee River, Wis., improvement of Milwaukee inner harbor------ I, 1481; II, 3120
Mermentau River, La.:
- Improvement, including tributaries------ I, 971; II, 2613
- Improvement of waterway to Franklin------ I, 958; II, 2604
- Improvement of waterway to Sabine River------ I, 961; II, 2606
- Operating and care of Schooner Bayou Lock------ I, 968; II, 2609

Merrimack River, Mass.:
- Improvement------ I, 106; II, 2018
- Improvement of Newburyport Harbor------ I, 103; II, 2017

Meters, water, installation in certain Government buildings------ I, 1918; III, 3759
Miakka River, Fla., examination and survey of waterway to Sarasota Bay------ I, 810
Miami Harbor, Fla.:
- Examination and survey------ I, 812
- Improvement------ I, 756; II, 2444

Michigan and Illinois Canal, war emergency work------ I, 1477; II, 3153
Michigan City Harbor, Ind., improvement------ I, 1466; II, 3144
Michigan, Lake:
- Canal to Sturgeon Bay, improvement------ I, 1411; II, 3108
- Channels in waters connecting Great Lakes, improvement------ I, 1527; II, 3199
- Examination and survey of bar at Great Lakes, Ill------ I, 1480
- Examination of harbors and connecting waters of Great Lakes------ I, 1654
- Illinois and Michigan Canal, war emergency work------ I, 1477; II, 3153
- Illinois and Mississippi Canal—
  - Improvement------ I, 1176; II, 2777
  - Operating and care------ I, 1177; II, 2778
- Surveys, charts, etc------ I, 1956; III, 3809
- Water levels------ I, 1956; III, 3809
- Waterway to Lake Erie, examination------ I, 1608

Middle Neebish Channel, St. Marys River, Mich., improvement------ I, 1527; II, 3199
Milford Harbor, Conn., improvement------ I, 205; II, 2083
Milford Haven Harbor, Va., improvement------ I, 529; II, 2300
Military maps and surveys------ I, 60
Military Railways, Director General of------ I, 73
Mill Creek, or River, Conn.:
- Improvement of New Haven Harbor------ I, 200; II, 2079
- Improvement of Southport Harbor------ I, 215; II, 2088
- Improvement of Stamford Harbor------ I, 223; II, 2092

Milwaukee, Wis.:
- Engineering district------ I, 1392; II, 3097
- Examination and survey of harbor------ I, 1447
- Improvement of inner and outer harbors------ I, 1431; II, 3120

Mines, submarine------ I, 49
Minim Creek-Estherville Canal, S. C., improvement------ I, 659; II, 2394
Mining casemates------ I, 49
Mining, hydraulic, in California------ I, 1853; III, 3445
Minnesota River, Minn.:
- Improvement------ I, 1199; II, 2789
- Operating snag and dredge boats------ I, 1173; II, 2774

Miscellaneous civil works, estimates for------ I, 1892
Mispillion River, Del., improveemnt------ I, 447; II, 2249
Mississippi River:
- Electrical-power development between St. Paul and Minneapolis------ I, 1182; II, 2781
- Examinations and surveys—
  - Head of Passes to headwaters (Mississippi River Commission)------ I, 1821
  - St. Paul Harbor, Minn------ I, 1210
  - South Pass------ I, 920; II, 2577
- Gaging, including tributaries, at or near St. Paul, Minn------ I, 1196; II, 2787
- Illinois and Michigan Canal, war emergency work------ I, 1477; II, 3153
- Improvement above Minneapolis—
  - Brainerd to Grand Rapids------ I, 1186; II, 2783
  - Leech and Mississippi Rivers------ I, 1188; II, 2783
  - Reservoir dams at headwaters------ I, 1191; II, 2785
  - St. Paul to Minneapolis------ I, 1182; II, 2781

Mississippi River—Continued.
  Improvement from Minneapolis to Missouri River— Page.
    Illinois and Mississippi Canal I, 1176; II, 2777
    Missouri River to Minneapolis I, 1163; II, 2747
Improvement from Missouri River to Ohio River I, 1155; II, 2725
  Improvement from Ohio River to Head of Passes—
    Cubits Gap to Head of Passes I, 911; II, 2555
    Head of Passes to Ohio River (Mississippi River Commission) I, 1866; III, 3459
  Improvement of Memphis Harbor, Miss. (Mississippi River Commission) I, 1866; III, 3459
  Improvement of Passes of Mississippi River—
    South Pass I, 917; II, 2570
    Southwest Pass, including shoals between Cubits Gap and Head of Passes, and dredge construction I, 911; II, 2555
  Improvement of waterway to Sabine River I, 958; II, 2604
  Levees, Head of Passes to Cape Girardeau, Mo I, 1866; III, 3459
  New Orleans, La., defenses I, 34
  Operating and care—
    Illinois and Mississippi Canal I, 1177; II, 2778
    Keokuk (Des Moines Rapids) Canal and Dry Dock I, 1171; II, 2771
    Moline, Ill., lock at I, 1172; II, 2773
    Reservoir dams at headwaters I, 1196; II, 2786
    Snag and dredge boats above Missouri River I, 1173; II, 2774
    Snag boats below Missouri River I, 1159; II, 2741
    Twin City Lock and Dam I, 1195; II, 2785
  Towboats, experimental, for use on I, 1873; III, 3455
Mississippi River Commission:
  Flood protection by I, 1866; III, 3459
  Improvement of Mississippi River by I, 1866; III, 3459
Mississippi Sound, Miss. and Ala.:
  Gulfport-Ship Island Channel and Ship Island Pass, improvement I, 890; II, 2544
  Horn Island Harbor, improvement I, 886; II, 2542
  Horn Island Pass, Miss., improvement I, 886; II, 2542
  Improvement of channel to Mobile Bay I, 869; II, 2525
Mississippi State, removal of water hyacinths from I, 983; II, 2619
Missouri River:
  Contributions from private agencies for improvement I, 1215, 1222, 1227
  Examination from Yankton to Vermilion, S. Dak I, 1242
  General I, 1211; II, 2793
  Kansas City to mouth, improvement I, 1212; II, 2794
  Kansas City to Sioux City, improvement I, 1220; II, 2820
  Sioux City to Fort Benton, improvement I, 1226; II, 2823
Mobile, Ala., engineering district I, 865; II, 2521
Mobile Bay and Harbor, Ala.:
  Defenses I, 34
  Examination and survey of waterway to Pensacola Bay, Fla I, 864
  Improvement of channel to Mississippi Sound I, 869; II, 2525
  Improvement of harbor and bar I, 865; II, 2521
Mobilization camps I, 17
Mokelumne River, Cal., improvement I, 1708; III, 3348
Moline Harbor, Ill.:
  Improvement of Mississippi River between Missouri River and Minneapolis, Minn I, 1163; II, 2747
  Operating and care of lock I, 1172; II, 2773
Monongahela River, W. Va. and Pa.:
  Improvement I, 1808; II, 2975
  Improvement of Pittsburgh Harbor I, 1822; II, 3000
  Operating and care of locks and dams I, 1314; II, 2976
Monroe Harbor, Mich., improvement I, 1569; II, 3258
Monroe Lake, St. Johns River, Fla., improvement I, 741; II, 2436
Monterey Harbor, Cal., improvement I, 1691; III, 3336
Montesano, Wash., improvement of Chehalis River at I, 1802; III, 3406
Montgomery, Ala.:
  Engineering district I, 812; II, 2479
  Erection of monument in Montgomery district I, 1996

Page.

- Monuments, statues, etc. *See* Statues, memorials, etc.
- Morehead City Harbor, N. C., improvement I, 622; II, 2366
- Mormon Channel, San Joaquin River, Cal., improvement I, 1706; III, 3342
- Morris Cove, New Haven Harbor, Conn., improvement I, 200; II, 2079
- Mortar batteries I, 42
- Mount Desert, Bar Harbor, Me., construction of breakwater I, 84; II, 2006
- Mud Lake, Mermentau River, La., improvement I, 971; II, 2613
- Mud River, Ga., improvement of waterway via I, 696; II, 2413
- Mud River, S. C., improvement of waterway via I, 693; II, 2412
- Mulberry Fork of Warrior River, examination and survey I, 910
- Murderkill River, Del., improvement I, 445; II, 2248
- Muscle Shoals Canal, Tennessee River, Ala., operating and care I, 1290; II, 2880
- Muscle Shoals Nitrate Plants, Tennessee River I, 1287; II, 2879
- Muskegon Harbor and River, Mich., improvement I, 1500; II, 3173
- Muskingum River, Ohio, operating and care of locks and dams I, 1347; II, 3051
- Mystic River, Conn., improvement I, 182; II, 2071
- Mystic River, Mass., improvement I, 130; II, 2036

N.

- Nansemond River, Va., improvement I, 560; II, 2324
- Nanticoke River, Del. and Md., improvement I, 488; II, 2275
- Nantucket Harbor, Mass., construction of harbor of refuge I, 152; II, 2050
- Nantucket Sound, Mass., improvement of Pollock Rip Channel I, 150; II, 2049
- Napa River, Cal., improvement I, 1686; III, 3333
- Narragansett Bay, R. I.:
  - Defenses I, 34
  - Improvement I, 164; II, 2059
- Narrows of Lake Champlain, N. Y. and Vt., improvement I, 287; II, 2146
- Nasel River, Wash., improvement I, 1795; III, 3403
- Nashville, Tenn., engineering district I, 1242; II, 2837
- Nassau Sound, improvement of waterway via I, 700; II, 2414
- Natalbany River, La., improvement I, 930; II, 2585
- National Army:
  - Divisional engineer or sapper regiments I, 12
  - Engineer officers I, 11
  - Railway Transportation Corps I, 15
- National Coast Defense Board I, 34
- National Parks. *See* Parks.
- Naugatuck River, Conn., examination and survey I, 229
- Navesink (North Branch of Shrewsbury) River, N. J., improvement I, 373; II, 2198
- Navigable waters. *See* Bridges, Rivers and harbors, *and* Wrecks.
- Navigation, Congresses of, Permanent International Association I, 1873
- Neches River, Tex.:
  - Examination and survey of Neches-Sabine Canal I, 1087
  - Improvement of Neches-Sabine Canal I, 1061; II, 2660
- Neebish Channels, St. Marys River, Mich., improvement I, 1527; II, 3199
- Nehalem Bar and Bay, Oreg.:
  - Examination of bay and river from bay entrance to town of Nehalem I, 1761
  - Improvement I, 1741; III, 3363
- Nemadji River, Wis., improvement of Duluth-Superior Harbor I, 1363; II, 3080
- Neosho River, Kans., examination for flood control I, 1162
- Neponset River, Mass., improvement I, 135; II, 2041
- Neuse River, N. C., improvement I, 597; II, 2348
- Newark Bay, N. Y. and N. J., improvement I, 339; II, 2175
- New Bedford Harbor, Mass.:
  - Defenses I, 34
  - Improvement I, 154; II, 2051
- New Buffalo Harbor, Mich., examination and survey I, 1480
- Newburyport Harbor, Mass., improvement I, 103; II, 2017
- New Haven Harbor, Conn.:
  - Construction of breakwaters I, 204; II, 2082
  - Examination and survey I, 229
  - Improvement by dredging, etc I, 200; II, 2079

Page.

- New Jersey and New York Channels, examination and survey — I, 378
- New Jersey coast waterway, Cape May to New York Bay, N. Y. and N. J., examination — I, 459
- New Jersey-Staten Island Channels, N. Y. and N. J., improvement — I, 347, 350; II, 2182, 2186
- New London, Conn.:
  - Engineering district — I, 178; II, 2069
  - Improvement of harbor — I, 184; II, 2072
- New Orleans, La.:
  - Defenses — I, 34
  - Engineering district — I, 911; II, 2555
- Newport Harbor, Cal., examination — I, 1670
- Newport Harbor, R. I., improvement — I, 161; II, 2057
- Newport News, Va., improvement of channels to — I, 545; II, 2317
- Newport, R. I., engineering district — I, 150; II, 2049
- Newport River, N. C., improvement of waterways between Beaufort and New River — I, 619; II, 2364
- New River, N. C.:
  - Improvement — I, 619; II, 2364
  - Improvement of waterways to Swansboro and Beaufort — I, 619; II, 2364
- New Rochelle, N. Y.:
  - Examination and survey of harbor — I, 299
  - Improvement of Echo Bay Harbor — I, 236; II, 2099
- Newtown Creek, N. Y., improvement — I, 315; II, 2160
- New Whatcom (Bellingham) Harbor, Wash., improvement of Whatcom Creek waterway — I, 1826; III, 3427
- NewYork and New Jersey Channels, examination and survey — I, 378
- New York Bay and Harbor, N. Y.:
  - Ambrose Channel, improvement — I, 300; II, 2151
  - Arthur Kill, improvement — I, 347, 350; II, 2182, 2186
  - Battery, the, removal of shoal in Hudson River off Pier A — I, 262; II, 2122
  - Bay Ridge Channel—
    - Examination and survey — I, 338
    - Improvement — I, 308; II, 2156
  - Bayside Channel, improvement — I, 300; II, 2151
  - Bronx River, improvement — I, 244; II, 2104
  - Channel, Staten Island-Hoffman and Swinburne Islands — I, 300; II, 2151
  - Coenties Reef, removal — I, 249; II, 2117
  - Coney Island Channel, improvement — I, 306; II, 2155
  - Constable Hook to Ellis Island, examination and survey — I, 378
  - Craven Shoal, improvement — I, 300; II, 2151
  - Defenses — I, 34
  - Drift, collection and removal — I, 312; II, 2157
  - East (Ambrose) Channel, improvement — I, 300; II, 2151
  - East Chester Creek, improvement — I, 238; II, 2100
  - East River, improvement, including Coenties Reef — I, 249; II, 2105
  - Flushing Bay—
    - Examination and survey — I, 338
    - Improvement — I, 317; II, 2162
  - Gedney Channel, improvement — I, 300; II, 2151
  - Gowanus Creek Channel, improvement — I, 310; II, 2157
  - Harlem River, improvement — I, 257; II, 2117
  - Hell Gate, East River, improvement — I, 249; II, 2105
  - Hudson River Channel, improvement — I, 262; II, 2122
  - Hutchinson River (East Chester Creek), improvement — I, 238; II, 2100
  - Kill Van Kull—
    - Examination — I, 378
    - Improvement — I, 347, 350; II. 2182. 2186
  - Main Ship Channel, improvement — I, 300; II, 2151
  - Narrows to the sea, improvement — I, 300; II, 2151
  - New Jersey-Staten Island Channels, improvement — I, 347, 350; II, 2182, 2186
  - Newtown Creek, N .Y., improvement — I, 315; II, 2160
  - North (Hudson) River, improvement — I, 267; II, 2132
  - Red Hook Channel, improvement — I, 308; II, 2156
  - Shooters Island Channel, improvement — I, 350; II, 2186
  - Spuyten Duyvil Creek, improvement — I, 257; II, 2117

New York Bay and Harbor, N. Y.—Continued. Page.
    Staten Island-Hoffman Island-Swinburne Island Channel I, 300; II, 2151
    Staten Island-New Jersey Channels, improvement I, 347, 350; II, 2182, 2186
    Staten Island Sound, improvement I, 347; II, 2182
    Supervision I, 1893; III, 3737
New York engineering districts:
    First I, 229; II, 2095
    Second I, 299; II, 2151
    Third I, 339; II, 2175
Nezpique Bayou, La.:
    Examination and survey I, 986
    Improvement I, 971; II, 2613
Niagara River, N. Y.:
    Black Rock Channel and Tonowanda Harbor, improvement I, 1621; II, 3290
    Buffalo Harbor, improvement I, 1616; II, 3285
    Control and regulation of waters of, and preservation of the Falls I, 1969; III, 3821
    Improvement I, 1627; II, 3294
    Supervision of power companies at the Falls I, 1969; III, 3821
    Surveys, etc I, 1956; III, 3809
Niantic Bay, Conn., examination and survey I, 229
Nitrate Plants, Muscle Shoals, Tennessee River I, 1287; II, 2879
Nome Harbor, Alaska, improvement I, 1835; III, 3432
Norfolk Harbor, Va.:
    Defenses I, 34
    General improvement, including main channel of Elizabeth River, and portions of Southern, Eastern, and Western Branches I, 538; II, 2309
    Improvement of channels to Newport News I, 545; II, 2317
    Improvement of Thimble Shoal I, 543; II, 2316
    Improvement of waterway to Beaufort Inlet I, 569; II, 2329
    Improvement of waterway to sounds of North Carolina (to Pamlico Sound) via Pasquotank River I, 567; II, 2327
    Operating and care of waterway to Beaufort Inlet, N. C I, 574; II, 2331
Norfolk, Va., engineering district I, 537; II, 2309
North Carolina Cut, N. C., improvement of waterway via I, 569; II, 2329
North Carolina Sounds, improvement of waterway to Norfolk, Va I, 567; II, 2327
Northeast River, N. C.:
    Examination and survey I, 647
    Improvement I, 638; II, 2377
Northern and northwestern lakes:
    Channels in waters connecting Great Lakes, improvement I, 1527; II, 3199
    Commercial statitstics, Sault Ste. Marie Canals, Mich I, 1547; II, 3219
    Control and regulation of waters of Niagara River, and preservation of Niagara Falls I, 1967; III, 3821
    Surveys, charts, etc I, 1956; III, 3809
    Water levels I, 1956; III, 3809
North Landing River, Va. and N. C., improvement of waterway via I, 569; II, 2329
North River, N. C., improvement of waterway via I, 569; II, 2329
North (Hudson) River, N. Y., improvement I, 267; II, 2132
North River, Wash., improvement I, 1795; III, 3403
Northwest Channel, Key West, Fla., examination and survey I, 811
Northwest Fork of Nanticoke River, Md., improvement I, 488; II, 2275
Northwest River, Va. and N. C., examination I, 582
Norwalk Harbor, Conn., improvement I, 219; II, 2089
Norwich Harbor, Conn., improvement of Thames River I, 187; II, 2074

O.

Oak Bay to Port Townsend Bay, Wash., waterway:
    Examination I, 1838
    Improvement I, 1808; III, 3408
Oakland Harbor, Cal.:
    Examination I, 1697
    Improvement I, 1675; III, 3328

Page.

- Obey River, Tenn., examination ... I, 1255
- Occoquan Creek, Va., improvement ... I, 518; II, 2294
- Ocmulgee River, Ga.:
  - Examination and survey ... I, 731
  - Improvement ... I, 721; II, 2421
- Oconee River, Ga., improvement ... I, 718; II, 2420
- Oconto Harbor, Wis., improvement ... I, 1898; II, 3101
- Office of the Chief of Engineers, officers on duty in ... I, 1997
- Ogdensburg Harbor, N. Y., improvement ... I, 1651; II, 3314
- Ohio River:
  - Falls at Louisville, Ky., improvement at ... I, 1292; II, 2925
  - General improvement (open-channel work) ... I, 1333; II, 3023
  - Ice piers ... I, 1338; II, 3023
  - Locks and dams, construction ... I, 1292; II, 2885
  - Locks and dams, operating and care ... I, 1306; II, 2951
  - Louisville & Portland Canal, Ky., enlargement ... I, 1292; II, 2925
  - Louisville & Portland Canal, Ky., operating and care ... I, 1306; II, 2968
  - Pittsburgh Harbor, Pa., improvement ... I, 1322; II, 3000
  - Snag boats, operation ... I, 1336; II, 3031
  - Surveys ... I, 1292; II, 2935
- Oklawaha River, Fla., improvement ... I, 746; II, 2439
- Olcott Harbor, N. Y., improvement ... I, 1632; II, 3302
- Oldmans Creek, N. J., improvement ... I, 409; II, 2230
- Old River (present mouth of Red River), La., removing snags and wrecks ... I, 1159; II, 2741
- Old River, Tex., examination and survey ... I, 1056
- Old River, Wash., improvement ... I, 1820; III, 3428
- Olympia Harbor, Wash., improvement ... I, 1810; III, 3409
- Onancock River, Va., improvement ... I, 565; II, 2326
- One Mile Creek, Ala., examination ... I, 910
- Ontario, Lake:
  - Channels in waters connecting Great Lakes, improvement ... I, 1527; II, 3199
  - Examination of harbors and connecting waters of Great Lakes ... I, 1654
  - Surveys, charts, etc ... I, 1956; III, 3809
  - Water levels ... I, 1956; III, 3809
  - Waterway to Lake Erie, examination ... I, 1655
- Ontonagon Harbor and River, Mich., improvement ... I, 1375; II, 3087
- Orange Mills Flats, St. Johns River, Fla., improvement ... I, 738; II, 2434
- Orange River, Fla., improvement ... I, 772; II, 2454
- Osage River, Mo.:
  - Improvement ... I, 1232; II, 2828
  - Operating and care of lock and dam ... I, 1240; II, 2834
- Oswego Harbor, N. Y.:
  - Examination and survey ... I, 1654
  - Improvement ... I, 1644; II, 3308
- Ouachita River, Ark. and La.:
  - Improvement ... I, 1091; II, 2680
  - Operating and care of locks and dams ... I, 1108; II, 2692
- Overpeck Creek, N. J., examination ... I, 377
- Oyster Creek, Tex., improvement ... I, 1028; II, 2642

P.

- Pagan River, Va., improvement ... I, 558; II, 2328
- Pamlico River, N. C.:
  - Examination and survey ... I, 646
  - Improvement ... I, 588; II, 2342
- Pamlico Sound, N. C.:
  - Improvement of waterway to Beaufort Inlet ... I, 611; II, 2357
  - Improvement of waterway to Norfolk, Va ... I, 567; II, 2327
- Pamunkey River, Va., improvement ... I, 533; II, 2305
- Panama Canal, fortification of ... I, 56
- Parks, public:
  - Crater Lake National Park, Oreg., improvement ... I, 1982; III, 3839
  - District of Columbia, improvement and care ... I, 1922; III, 3778
  - Yellowstone National Park, improvement ... I, 1972; III, 3827

Page.
Pascagoula Harbor and River, Miss.:
  Improvement of harbor — I, 886; II, 2542
  Improvement of river above mouth of Dog River — I, 897; II, 2548
Pasquotank River, N. C., improvement of waterway via — I, 567; II, 2327
Passaic River, N. J., improvement — I, 339; II, 2175
Pass Cavallo, Tex.:
  Improvement of channel to Aransas Pass — I, 1039; II, 2646
  Improvement of channel to Port Lavaca — I, 1038; II, 2645
Passes of Mississippi River, improvement — I, 911; II, 2555
Pass Manchac, La., improvement — I, 928; II, 2582
Patapsco River, Md., improvement of Baltimore Harbor and Channels — I, 460; II, 2255
Patchogue River, N. Y., improvement — I, 334; II, 2171
Pawcatuck River, R. I. and Conn., improvement — I, 178; II, 2069
Pawtucket (Seekonk) River, R. I.:
  Examination and survey — I, 177
  Improvement — I, 168; II, 2062
Peace River, Fla.:
  Examination and survey — I, 812
  Improvement — I, 774; II, 2455
Pearl Harbor, Hawaii, defenses — I, 52
Pearl River, Miss.:
  Examination and survey — I, 910
  Improvement below Rockport — I, 907; II, 2552
  Improvement of East Pearl River — I, 905; II, 2551
Peconic Bay, N. Y., examination and survey of channel to Great South Bay — I, 338
Peedee Rivers, S. C.:
  Improvement of Great Peedee River — I, 656; II, 2393
  Improvement of Little Peedee River — I, 654; II, 2392
Peekskill Harbor, N. Y., improvement — I, 277; II, 2139
Penobscot River, Me., improvement — I, 87; II, 2007
Pensacola Bay and Harbor, Fla.:
  Defenses — I, 34
  Examination and survey of waterway to Mobile Bay, Ala — I, 864
  Improvement of harbor — I, 848; II, 2507
Pentwater Harbor, Mich.:
  Examination and survey — I, 1527
  Improvement — I, 1524; II, 3196
Pepperells Cove, Me., improvement — I, 101; II, 2016
Pequonnock (Poquonock) River, Conn., improvement — I, 211; II, 2085
Pere Marquette Lake, Ludington Harbor, Mich., improvement — I, 1505; II, 3178
Permanent International Association of Congresses of Navigation — I, 1873
Permits:
  For construction of bridges — I, 1879
  For diversion of water from Niagara River, N. Y., and for transmission of electrical power from Canada — I, 1969; III, 3821
  For private structures and operations in navigable waters — I, 1886
Petaluma Creek, Cal.:
  Examination and survey — I, 1699
  Improvement — I, 1688; III, 3334
Petersburg, Va., improvement of Appomattox River — I, 553; II, 2322
Petoskey Harbor, Mich., improvement — I, 1521; II, 3149
Philadelphia, Pa.;
  Engineering district — I, 378; II, 2201
  Erection of monuments in Philadelphia district — I, 1994
  Improvement of Delaware River at — I, 382; II, 2205
Philippine Islands:
  Contingencies — I, 62
  Defenses — I, 52
Pierhead lines, establishment — I, 1888
Pierre, Fort, S. Dak., improvement of Missouri River at — I, 1226; II, 2823
Piers, permits for construction — I, 1886
Pigeon Bayous, La., improvement — I, 942; II, 2592
Pine Bluff, Ark., improvement of Arkansas River at — I, 1127; II, 2707
Pine Lake and River (Charlevoix Harbor), Mich., improvement — I, 1518; II, 3192

Page.

Pine River Reservoir, Minn.:
  Construction .... I, 1191; II, 2785
  Operating and care .... I, 1196; II, 2786
Pithlachascotee River, Fla., examination .... I, 811
Pittsburgh, Pa.:
  Engineering district .... I, 1308; II, 2975
  Improvement of harbor .... I, 1322; II, 3000
Plant, floating, statement of .... I, 1877; III, 3945
Plaquemine Bayou, La.:
  Improvement .... I, 942; II, 2592
  Operating and care of lock and dam in .... I, 953; II, 2598
Plaquemine Brulé Bayou, La., improvement .... I, 977; II, 2616
Plattsburg Harbor, N. Y., improvement .... I, 293; II, 2148
Plymouth Harbor, Mass., improvement .... I, 144; II, 2046
Pocomoke River, Md., improvement .... I, 503; II, 2284
Point Judith, construction of harbor of refuge .... I, 170; II, 2063
Pokegama Reservoir, Minn.:
  Construction .... I, 1191; II, 2785
  Operating and care .... I, 1196; II, 2786
Pollock Rip Channel, Mass., improvement .... I, 150; II, 2049
Polson Bay, Flathead Lake, Mont., improvement .... I, 1832; III, 3431
Ponchatoula River, La., improvement of Tickfaw River .... I, 930; II, 2585
Pontchartrain Lake, La., improvement .... I, 923; II, 2580
Poplar Island Harbor, Md., examination .... I, 506
Poquonock River, Conn., improvement .... I, 211; II, 2085
Porcupine Island, Bar Harbor, Me., construction of breakwater .... I, 84; II, 2006
Portage Lake and Lake Superior canals, Houghton County, Mich., improvement .... I, 1378; II, 3088
Portage Lake, Manistee County, Mich., harbor of refuge, improvement .... I, 1512; II, 3186
Portage River, Ohio, improvement of Port Clinton Harbor .... I, 1576; II, 3261
Port Aransas, Tex.:
  Examination and survey of channel to San Antonio and Rockport .... I, 1056
  Improvement .... I, 1051; II, 2651
  Improvement of Harbor Island Harbor .... I, 1051; II, 2651
Port Arthur Canal, Tex.:
  Examination and survey .... I, 1087
  Improvement .... I, 1057; II, 2655
Port Bolivar, Tex.:
  Examination and survey of channel to .... I, 1056
  Improvement of channel to .... I, 999; II, 2630
Port Chester Harbor, N. Y., improvement .... I, 230; II, 2095
Port Clinton Harbor, Ohio, improvement .... I, 1576; II, 3261
Port Gamble Harbor, Wash., examination of entrance .... I, 1838
Port Henry Harbor, N. Y., improvement .... I, 296; II, 2149
Port Huron, Mich., improvement of Black River at .... I, 1561; II, 3253
Port Jefferson Harbor, N. Y., improvement .... I, 324; II, 2166
Portland and Louisville Canal, Ky.:
  Enlargement .... I, 1292; II, 2925
  Operation and care .... I, 1306; II, 2968
Portland, Me.:
  Defenses .... I, 34
  Engineering district .... I, 81; II, 2005
  Improvement of harbor .... I, 96; II, 2011
Portland, Oreg., engineering districts:
  First .... I, 1719; III, 3351
  Second .... I, 1762; III, 3377
Port Lavaca, Tex., improvement of channel to Pass Cavallo .... I, 1038; II, 2645
Porto Rico:
  Engineering district .... I, 1848; III, 3441
  Improvement of San Juan Harbor .... I, 1849; III, 3441
Port Royal (Beaufort) River, S. C., waterway between Beaufort, S. C., and Savannah, improvement .... I, 693; II, 2412
Port Royal, S. C., defenses .... I, 34
Portsmouth Harbor, N. H., defenses .... I, 34

Page.

- Port Townsend Bay to Oak Bay, Wash., waterway:
  - Examination ---- I, 1838
  - Improvement ---- I, 1808; III, 3408
- Port Washington Harbor, Wis., improvement ---- I, 1428; II, 3119
- Port Watsonville Harbor, Cal., examination and survey ---- I, 1699
- Port Wing Harbor, Wis., improvement ---- I, 1369; II, 3084
- Potomac Park, Washington, D. C., improvement ---- I, 1929; III, 3773
- Potomac River:
  - Aqueduct Bridge, Washington, D. C., repair ---- I, 1909
  - Highway Bridge at Washington, D. C ---- I, 1922; III, 3799
  - Improvement at Alexandria, Va ---- I, 514; II, 2291
  - Improvement at Lower Cedar Point, Md ---- I, 516; II, 2293
  - Improvement at Washington, D. C ---- I, 507; II, 2287
  - Key Bridge, Georgetown, D. C., construction ---- I, 1912
- Power companies at Niagara Falls, N. Y., supervision of ---- I, 1969; III, 3821
- Power, water:
  - Black Warrior River, Ala., at Dam 17 ---- I, 872; II, 2526
  - Mississippi River, dam between St. Paul and Minneapolis, Minn ---- I, 1182; II, 2781
  - Niagara River, N. Y., control and regulation ---- I, 1969; III, 3821
  - Tennessee River, Elk River Shoals to Florence, Ala ---- I, 1290; II, 2880
- Presque Isle Harbor, Marquette, Mich., improvement ---- I, 1382; II, 3090
- Presque Isle Peninsula, Erie, Pa., improvement ---- I, 1609; II, 3279
- Princeton, N. J., battle-field monument ---- I, 1995
- Printing Office, Government, Washington, D. C., telegraph line ---- I, 1940; III, 3799
- Private structures and operations in navigable waters, permits for ---- I, 1896
- Providence Harbor and River, R. I.:
  - Examination and survey of harbor ---- I, 177
  - Improvement ---- I, 164; II, 2059
  - Improvement of Pawtucket (Seekonk) River ---- I, 168; II, 2062
  - Removal of Green Jacket Shoal ---- I, 164; II, 2059
- Provincetown Harbor, Mass., improvement ---- I, 147; II, 2048
- Public buildings and grounds, District of Columbia ---- I, 1922; III, 3773
- Public Buildings Commission ---- I, 1945; III, 3804
- Puget Sound, Wash.:
  - Defenses ---- I, 34
  - Improvement of, and tributaries ---- I, 1806; III, 3407
  - Improvement of Lake Washington Canal ---- I, 1815; III, 3416
  - Operating and care of Lake Washington Canal ---- I, 1831; III, 3429
- Pultneyville Harbor, N. Y., improvement ---- I, 1637; II, 3304
- Purification of water supply of Washington, D. C ---- I, 1916; III, 3759
- Puyallup River, Wash.:
  - Improvement of Puget Sound and tributaries ---- I, 1806; III, 3407
  - Improvement of Tacoma Harbor ---- I, 1812; III, 3410

Q.

- Queens Creek, N. C., examination and survey ---- I, 647
- Queenstown Harbor, Md., improvement ---- I, 473; II, 2266
- Queue de Tortue Bayou, La.:
  - Examination ---- I, 985
  - Improvement ---- I, 974; II, 2615
- Quinnipiac River, New Haven, Conn.:
  - Examination and survey ---- I, 229
  - Improvement ---- I, 200; II, 2079

R.

- Raccoon Creek, N. J., improvement ---- I, 407; II, 2229
- Racine Harbor, Wis., improvement ---- I, 1437; II, 3123
- Rahway River, N. J., examination and survey ---- I, 377
- Railways, Director General of military ---- I, 73
- Railway Transportation Corps, National Army ---- I, 15
- Raisin River, Mich., improvement of Monroe Harbor ---- I, 1569; II, 3258
- Rappahannock River, Va., improvement ---- I, 523; II, 2296

Page.

Raritan Bay and River, N. J.:
- Examination and survey of bay ---- I, 378
- Improvement of bay ---- I, 357; II, 2188
- Improvement of river ---- I, 359; II, 2190

Red Cross, memorial to women of Civil War to be used by ---- I, 1043; III, 3802

Red Hook Channel, New York Harbor, N. Y., improvement ---- I, 308; II, 2156

Red Lake and Red Lake River, Minn.:
- Examination and survey ---- I, 1210
- Improvement ---- I, 1202; II, 2790

Red River, La., Ark., Tex., and Okla.:
- Cypress Bayou and lakes to Jefferson, Tex., improvement ---- I, 1082; II, 2675
- Examination for flood control ---- I, 1162
- Improvement above Fulton, Ark., to mouth of Washita River ---- I, 1078; II, 2673
- Improvement below Fulton, Ark ---- I, 1088; II, 2677
- Jefferson-Shreveport waterway, improvement ---- I, 1082; II, 2675
- Rectification of mouth by Mississippi River Commission ---- I, 1866; III, 3459

Red River of the North, Minn. and N. Dak., improvement ---- I, 1202; II, 2790

Redwood City Harbor, Cal., examination and survey ---- I, 1609

Redwood Creek, Cal., improvement ---- I, 1673; III, 3327

Regulations and rules:
- For anchorage grounds ---- I, 1878
- For floating loose timber and logs, etc ---- I, 1878
- For navigation of canals ---- I, 1878
- For opening of drawbridges ---- I, 1879

Rehoboth Bay, Del., waterway to Delaware Bay, improvement ---- I, 452; II, 2251

Renton Harbor, Wash., examination ---- I, 1838

Republican River, Kans., protection of bank line in front of Fort Riley Military Reservation ---- I, 1241; II, 2836

Reservations, public. *See* Parks.

Reserve Corps, Engineer Enlisted ---- I, 10

Reserve Corps, Engineer Officers' ---- I, 8

Reserve Corps, special enlisted ---- I, 10

Reservoirs:
- Mississippi River, headwaters—
  - Construction ---- I, 1191; II, 2785
  - Operating and care ---- I, 1196; II, 2786
- Tidal reservoir, Potomac River, D. C ---- I, 507; II, 2287
- Washington Aqueduct, D. C ---- I, 1916; III, 3759

Richmond Harbor, Cal., improvement ---- I, 1679; III, 3330

Richmond Harbor, Va., improvement of James River ---- I, 549; II, 2319

Riley, Fort, Kans., protection of bank line of Republican River ---- I, 1241; II, 2836

Rivers and harbors:
- Allotments and transfers under river and harbor act of Mar. 4, 1915 ---- I, 78
- Appropriations for operations during the past year ---- I, 76
- Board of Engineers for ---- I, 79; II, 2001
- Board of Engineers, The ---- I, 83
- Bridges, construction and alteration ---- I, 1879, 1885
- Bridges, regulations for opening of draws ---- I, 1878
- Contingencies, estimate for ---- I, 1877
- Estimate of appropriations for ---- I, 79, 1877
- Expenditures during the past year ---- I, 77
- Harbor lines, establishment ---- I, 1888
- Regulations for navigation of canals ---- I, 1878
- Regulations for opening of drawbridges ---- I, 1879
- Status of works ---- I, 81
- Structures other than bridges, permits for erection ---- I, 1886

Roads:
- In Alaska, Board of Commissioners for ---- I, 1986; III, 3841
- In Crater Lake National Park, Oreg ---- I, 1982; III, 3839
- In insular possessions ---- I, 57
- In Yellowstone National Park ---- I, 1972; III, 3827

Roanoke River, N. C., improvement ---- I, 579; II, 2334

Rockhall Harbor, Md., improvement ---- I, 468; II, 2262

Rock Island, Ill., engineering district ---- I, 1162; II, 2747

Page.
Rockland Harbor, Me., improvement ---- I, 89; II, 2008
Rockport, Mass., harbor of refuge in Sandy Bay, construction of ---- I, 109; II, 2020
Rock River, Ill. and Wis.:
  Illinois and Mississippi Canal—
    Improvement ---- I, 1176; II, 2777
    Operating and care ---- I, 1177; II, 2778
  Operating snag boats and dredge boats ---- I, 1178; II, 2774
Rogers City Harbor, Mich., improvement ---- I, 1552; II, 3245
Romerly Marsh, Ga., improvement of waterway via ---- I, 698; II, 2412
Rondout Harbor, N. Y., improvement ---- I, 284; II, 2145
Rouge River Mich., improvement ---- I, 1566; II, 3256
Rough River, Ky., operating and care of lock and dam ---- I, 1344; II, 3047
Round Lake, Charlevoix Harbor, Mich., improvement ---- I, 1518; II, 3192
Rules and regulations:
  For anchorage grounds ---- I, 1878
  For floating loose timber and logs, etc ---- I, 1878
  For navigation of canals ---- I, 1877
  For opening of drawbridges ---- I, 1879

S.

Sabine and Galveston Section of Inland Waterway, Tex., examination and survey ---- I, 1056
Sabine-Neches Canal:
  Contributions for improvement ---- I, 1063
  Examination and survey ---- I, 1067
  Improvement ---- I, 1061; II, 2660
Sabine River, Tex.:
  Examination of waterway to Calcasieu River, La ---- I, 986
  Improvement of Sabine-Neches Canal ---- I, 1061; II, 2660
  Improvement of Sabine Pass Harbor ---- I, 1057; II, 2655
  Improvement of waterway to Mermentau River, La ---- I, 961; II, 2606
  Improvement of waterway to Mississippi River ---- I, 958; II, 2604
Saco River, Me., improvement ---- I, 99; II, 2014
Sacramento River, Cal.:
  Alleviation of débris by California Débris Commission ---- I, 1860; III, 3445
  Examination and survey ---- I, 1719
  Flood control by California Débris Commission ---- I, 1860; III, 3445
  Improvement ---- I, 1711, 1860; III, 3344
Saginaw River, Mich., improvement ---- I, 1557; II, 3248
St. Andrews Bay, Fla.:
  Improvement of bay ---- I, 838; II, 2496
  Improvement of channel to Apalachicola River ---- I, 829; II, 2493
St. Clair Flats Canal, Lake, and River, Mich.:
  Improvement of channels in Lake St. Clair ---- I, 1538; II, 3209
  Improvement of channels in waters connecting the Great Lakes ---- I, 1527; II, 3199
  Improvement of river ---- I, 1535; II, 3208
  Operating and care of canal ---- I, 1547; II, 3241
St. Croix River, Me., improvement ---- I, 82; II, 2005
St. Croix River, Wis. and Minn.:
  Improvement ---- I, 1196; II, 2788
  Operating snag boats and dredge boats ---- I, 1173; II, 2774
St. Francis River, Ark.:
  Examination and survey ---- I, 1154
  Improvement ---- I, 1145; II, 2718
St. George Sound, Fla.:
  Examinations and surveys ---- I, 810, 864
  Improvement of Carrabelle Harbor ---- I, 812; II, 2479
St. Joe River, Idaho, examination and survey ---- I, 1838
St. Johns River, Fla.:
  Examination of Florida East Coast Canal to Key West ---- I, 811
  Improvement at Jacksonville ---- I, 736; II, 2432
  Improvement between Jacksonville and Palatka, including Orange Mills Flats ---- I, 738; II, 2434
  Improvement between Palatka and Lake Harney ---- I, 741; II, 2436

Page.

- St. Johns River, Fla.—Continued.
  - Improvement Jacksonville to the ocean ---- I, 732; II, 2427
  - Improvement of Volusia Bar and between Volusia Bar and Lake Monroe ---- I, 741; II, 2436
  - Improvement of waterway to Beaufort, S. C. ---- I, 693; II, 2412
  - Improvement of waterway to Cumberland Sound ---- I, 700; II, 2414
- St. Jones River, Del., improvement ---- I, 443; II, 2247
- St. Joseph Bay, Fla., improvement of entrance ---- I, 831; II, 2495
- St. Joseph Harbor and River, Mich.:
  - Improvement of harbor ---- I, 1481; II, 3155
  - Improvement of river ---- I, 1484; II, 3159
- St. Louis Bay and River, Minn., and Wis., improvement ---- I, 1363; II, 3080
- St. Louis, Mo., engineering district ---- I, 1155; II, 2725
- St. Lucie Inlet, Fla., improvement ---- I, 754; II, 2443
- St. Marys River and St. Marys Falls Canal, Mich.:
  - Channels in waters connecting the Great Lakes, improvement ---- I, 1527; II, 3199
  - Commercial statistics ---- I, 1547; II, 3219
  - Improvement of river at the falls, including Hay Lake and Neebish Channels ---- I, 1527; II, 3199
  - Operating and care of canal ---- I, 1546; II, 3214
  - Surveys, etc ---- I, 1956; III, 3809
- St. Marys River, Ga. and Fla., improvement ---- I, 712; II, 2418
- St. Marys River, Idaho, examination and survey ---- I, 1838
- St. Paul, Minn.:
  - Engineering district ---- I, 1181; II, 2781
  - Examination and survey of harbor ---- I, 1210
  - Gaging Mississippi River at ---- I, 1196; II, 2787
- St. Petersburg Harbor, Fla., improvement ---- I, 804; II, 2475
- Salem Harbor, Mass., improvement ---- I, 125; II, 2034
- Salem River, N. J., improvement ---- I, 411; II, 2231
- Saline River, Ark., improvement ---- I, 1103; II, 2690
- Salmon Bay, Wash.:
  - Improvement of Lake Washington Canal ---- I, 1815; III, 3416
  - Operating and care of Lake Washington Canal ---- I, 1831; III, 3429
- Salmon Creek, Pultneyville Harbor, N. Y., improvement ---- I, 1637; II, 3304
- Sampit River (Georgetown Harbor), S. C., improvement ---- I, 648; II, 2387
- Sampit River, S. C., examination and survey ---- I, 677
- San Antonio and Rockport, Tex., to Harbor Island and Port of Aransas, examination and survey of channel ---- I, 1056
- San Antonio Bay, Tex., improvement of waterway via ---- I, 1035; II, 2645
- San Antonio River, Tex.:
  - Examination and survey ---- I, 1056
  - Examination for flood control ---- I, 1056
- San Bernard River, Tex., examination and survey ---- I, 1056
- Sandbeach (Harbor Beach), Mich., improvement of harbor of refuge ---- I, 1559; II, 3249
- San Diego Harbor, Cal.:
  - Defenses ---- I, 34
  - Improvement ---- I, 1657; III, 3317
- Sandusky Harbor, Ohio, improvement ---- I, 1578; II, 3263
- Sandy Bay, Cape Ann, Mass., construction of harbor of refuge ---- I, 109; II, 2020
- Sandy Hook Reservation, N. J., protection of ---- I, 47
- Sandy Lake Reservoir, Minn.:
  - Construction ---- I, 1191; II, 2785
  - Operating and care ---- I, 1196; II, 2786
- San Francisco Bay and Harbor, Cal.:
  - Defenses ---- I, 34
  - Engineering districts—
    - First ---- I, 1670; III, 3325
    - Third ---- I, 1699; III, 3339
  - Examination of south end of bay to provide harbors for Santa Clara Valley ---- I, 1697
  - Improvement by removal of rocks ---- I, 1671; III, 3325
  - Improvement of Oakland Harbor ---- I, 1675; III, 3328

Page.

San Jacinto River, Tex., improvement of waterway via i, 1002; ii, 2831
San Joaquin River, Cal.:
- Examinations and surveys i, 1719
- Improvement i, 1700; iii, 3339
- Improvement of Stockton and Mormon Channels i, 1706; iii, 3342
- Work of California Débris Commission i, 1852; iii, 3445

San Juan Harbor, P. R., improvement i, 1849; iii, 3441
San Leandro Bay, Oakland Harbor, Cal., improvement i, 1675; iii, 3328
San Luis Obispo Harbor, Cal., improvement i, 1668; iii, 3324
San Pablo Bay, Cal., improvement i, 1681; iii, 3331
San Pedro Bay and Harbor, Cal.:
- Construction of deep-water harbor i, 1660; iii, 3319
- Improvement of Wilmington inner harbor i, 1660; iii, 3319

Santa Cruz Harbor, Cal., examination and survey i, 1699
Santa Rosa Sound, Fla., improvement of The Narrows i, 841; ii, 2502
Santee River, S. C., improvement i, 659; ii, 2394
Sapelo Bar and Harbor, Ga., improvement i, 704; ii, 2415
Sarasota Bay, Fla.:
- Examination and survey of waterway to Miakka River, Fla i, 810
- Examination of Little Sarasota Bay to Venice i, 811
- Improvement i, 776; ii, 2457

Satilla River, Ga., improvement i, 710; ii, 2417
Saugatuck Harbor, Mich., improvement i, 1489; ii, 3162
Saugatuck River, Conn., improvement i, 217; ii, 2088
Saugerties Harbor, N. Y., improvement i, 281; ii, 2144
Saugus River, Lynn Harbor, Mass., improvement i, 127; ii, 2035
Savannah, Ga., engineering district i, 678; ii, 2405
Savannah Harbor and River, Ga.:
- Defenses i, 34
- Examinations and surveys i, 730
- Improvement of harbor i, 678; ii, 2405
- Improvement of river above Augusta i, 690; ii, 2411
- Improvement of river at Augusta i, 687; ii, 2410
- Improvement of river below Augusta i, 684; ii, 2409
- Improvement of waterway to Beaufort, S. C i, 693; ii, 2412
- Improvement of waterway to Fernandina, Fla i, 696; ii, 2413

Saw Pit Creek, improvement of waterway via i, 700; ii, 2414
Saybrook Harbor, Connecticut River, Conn., improvement i, 192; ii, 2076
School, Engineer, buildings i, 75
Schooner Bayou, La., operating and care of lock i, 968; ii, 2609
Schuylkill River, Pa., improvement i, 391; ii, 2219
Scott Point, Tennessee River, Ala., lock and dam at Hales Bar, operating and care i, 1275; ii, 2873
Scuppernong River, N. C., improvement i, 582; ii, 2337
Seacoast defenses i, 34
Seacoast fortifications, contingent expenses i, 49
Searchlights i, 44
Searcy Creek, Fla., improvement of waterway via i, 829; ii, 2493
Seattle, Wash., engineering district i, 1795; iii, 3403
Sea walls:
- Defenses of Galveston, Tex i, 48
- Embankments and i, 46
- Hawaiian Islands i, 55

Seekonk (Pawtucket) River, R. I.:
- Examination and survey i, 177
- Improvement i, 168; ii, 2062

Shallotte River, N. C., improvement i, 644; ii, 2384
Shallowbag Bay, N. C., improvement i, 585; ii, 2339
Shallow Bayou, La., examination and survey i, 1087
Shaws Cove, New London, Conn., improvement i, 184, 187; ii, 2072
Sheboygan Harbor, Wis., improvement i, 1425; ii, 3118
Sheepshead Bay, N. Y.:
- Examination and survey i, 338
- Improvement i, 328; ii, 2168

Sheffield Island Harbor, Conn., improvement of Norwalk Harbor i, 219; ii, 2089
Ship Island Harbor and Pass, Miss., improvement of pass and channel to Gulfport i, 890; ii, 2544

Page.
Shoal Harbor, N. J., improvement i, 371; ii, 2197
Shooters Island Channel, N. Y. and N. J., improvement i, 350; ii, 2180
Shreveport, La., to Jefferson, Tex., improvement of waterway i, 1082; ii, 2675
Shrewsbury River, N. J., improvement i, 373; ii, 2198
Silver Lake Harbor, N. C., examination and survey i, 647
Silver Springs Run, Fla., improvement i, 746; ii, 2439
Sisters Creek, Fla., improvement of waterways via i, 700; ii, 2414
Sites of fortifications i, 44, 51
Siuslaw River, Oreg., improvement i, 1729; iii, 3358
Skagit River, Wash., improvement i, 1822; iii, 3425
Skidaway Narrows, Ga., improvement of waterway via i, 696; ii, 2413
Slack-water systems. *See* Canals *and* Waterways.
Slaughter Creek, Md., improvement i, 487; ii, 2275
Smiths Creek, N. C.:
  Examination and survey i, 647
  Improvement i, 600; ii, 2350
Smyrna River, Del., improvement i, 437; ii, 2244
Snake River, Idaho, Oreg., and Wash.:
  Examinations and surveys i, 1762
  Improvement i, 1754; iii, 3370
Snohomish River, Wash.:
  Examination i, 1839
  Improvement i, 1820; iii, 3423
Soda Lake, La., improvement of waterway via i, 1082; ii, 2675
South Chicago Harbor, Ill., improvement i, 1456; ii, 3137
Southern Branch, Elizabeth River, Va., improvement i, 538; ii, 2309
Southern Department, engineer depots i, 69
South Haven Harbor, Mich., improvement i, 1485; ii, 3159
South Pass, Mississippi River:
  Examinations and surveys i, 920; ii, 2577
  Maintenance of channel i, 917; ii, 2570
Southport Harbor, Conn., improvement i, 215; ii, 2088
South River, N. C., improvement i, 593; ii, 2345
South River, N. J., improvement i, 362; ii, 2192
Southwest Baltimore, Md., improvement at Spring Garden i, 460; ii, 2255
Southwest Pass, Mississippi River, improvement, including shoals between
  Cubits Gap and Head of Passes, and dredge construction i, 911; ii, 2555
Spring Garden, Baltimore, Md., improvement of harbor at i, 460; ii, 2255
Spuyten Duyvil Creek, N. Y., improvement i, 257; ii, 2117
Stamford Harbor, Conn., improvement i, 223; ii, 2092
Staten Island-New Jersey Channels, improvement i, 347, 350; ii, 2182, 2186
Staten Island Sound (Arthur Kill), N. Y. and N. J.:
  Examination and survey i, 378
  Improvement i, 347, 350; ii, 2182, 2186
Statues, memorials, etc.:
  Abraham Lincoln memorial i, 1942; iii, 3801
  Arlington memorial amphitheater and chapel i, 1944; iii, 3803
  In public grounds, Washington, D. C i, 1938; iii, 3773
  Macdonough memorials, Lake Champlain, N. Y. and Vt i, 1993
  Memorial to Gen. Ulysses S. Grant i, 1942; iii, 3801
  Monument and wharf at Wakefield, Va i, 1942; iii, 3800
  Monument at Germantown, Pa i, 1994
  Monument at Horseshoe battle ground, Ala i, 1996
  Monument on Princeton battle field i, 1995
  Monument to Commodore John Barry i, 1942; iii, 3801
  Monument to Francis Scott Key i, 1944; iii, 3804
  Red Cross, memorial to women of Civil War to be used by i, 1943; iii, 3802
Steele Bayou, Miss., improvement i, 1122; ii, 2703
Sterling Basin, at Greenport, N. Y., examination i, 338
Stockton Channel, San Joaquin River, Cal.:
  Examination and survey i, 1719
  Improvement i, 1706; iii, 3342
Stonington Harbor, Conn i, 181; ii, 2070
Structures in navigable waters, permits for private structures and operations i, 1886

Page.

- Sturgeon Bay and Lake Michigan Canal, Wis., improvement — I, 1411; II, 3108
- Submarine mines — I, 49
- Suisun Bay, Cal., examination of channel from Martinez to Antioch — I, 1697
- Suisun Creek or Channel, Cal., improvement — I, 1684; III, 3332
- Sulphur River, Ark. and Tex.:
  - Examination and survey — I, 1087
  - Examination and survey of Days Creek and — I, 1087
  - Improvement — I, 1081; II, 2674
- Sunflower River, Miss., improvement of Big Sunflower River — I, 1117; II, 2700
- Sunken craft, removal of. *See* Wrecks.
- Superior Bay and Harbor, Wis., improvement of Duluth-Superior Harbor — I, 1363; II, 3080
- Superior, Lake:
  - Channels in waters connecting Great Lakes, improvement — I, 1527; II, 3199
  - Examination of harbors and connecting waters of Great Lakes — I, 1654
  - Keweenaw Bay-Lake Superior waterway, Mich., improvement, I, 1378; II, 3088
  - Surveys, charts, etc — I, 1956; III, 3809
  - Water levels — I, 1956; III, 3809
- Supervision of New York Harbor, N. Y — I, 1893; III, 3737
- Surface levels. *See* Water levels.
- Surveys:
  - Military and maps — I, 60
  - Of Northern and Northwestern Lakes — I, 1956; III, 3809
  - Of rivers and harbors, estimate of appropriation for — I, 1877
  - Ohio River — I, 1292; II, 2885
- Susquehanna River, Md.:
  - Examination of North Branch — I, 506
  - Improvement — I, 465; II, 2259
- Suwannee River, Fla., improvement — I, 788; II, 2464
- Swan Quarter Bay to Deep Bay, N. C., improvement of waterway, I, 587; II, 2341
- Swansboro, N. C., waterway to New River and Beaufort, improvement, I, 619; II, 2364
- Swift Creek, N. C., improvement — I, 603; II, 2352
- Swinomish Slough, Wash., improvement — I, 1824; III, 3426

T.

- Tacoma Harbor, Wash., improvement — I, 1812; III, 3410
- Tallahatchie River, Miss., improvement — I, 1113; II, 2697
- Tallapoosa River, Ala., monument at Horseshoe Battle Ground — I, 1996
- Tampa Bay and Harbor, Fla.:
  - Defenses — I, 34
  - Examination and survey of waterway to St. George Sound — I, 810
  - Improvement of bay — I, 792, 794; II, 2465, 2468
  - Improvement of channel to Clearwater Harbor — I, 779; II, 2459
  - Improvement of Hillsboro Bay and River — I, 794, 799; II, 2468, 2471
- Tangipahoa River, La., examination and survey — I, 986
- Tar River, N. C.:
  - Examination and survey — I, 646
  - Improvement — I, 588; II, 2342
- Tarrytown Harbor, N. Y., improvement — I, 274; II, 2138
- Taunton River, Mass., improvement — I, 159; II, 2056
- Tchula Lake, Miss., improvement — I, 1111; II, 2696
- Teche Bayou, La.:
  - Examination — I, 980
  - Improvement — I, 948; II, 2596
  - Improvement of waterway from Franklin to Mermentau — I, 958; II, 2604
  - Operating and care of Keystone Lock — I, 954; II, 2600
- Telegraph line, Government, Washington, D. C — I, 1940; III, 3799
- Tennessee River:
  - Above Chattanooga, improvement — I, 1256; II, 2857
  - Bee Tree Shoals Canal, Ala., operating and care — I, 1276; II, 2875
  - Below Riverton, Ala., improvement — I, 1271; II, 2868

- Tennessee River—Continued. Page.
  - Browns Island to Florence, improvement, I, 1290; II, 2880
  - Chattanooga to Hales Bar, improvement, I, 1261; II, 2862
  - Chattanooga to Riverton, improvement, I, 1261; II, 2862
  - Colbert Shoals Canal, operating and care, I, 1276; II, 2875
  - Elk River Shoals Canal, Ala., operating and care, I, 1290; II, 2880
  - Examination and survey, I, 1286
  - Florence to Colbert Shoals, improvement, I, 1261; II, 2862
  - Hales Bar Lock and Dam, operating and care, I, 1275; II, 2873
  - Hales Bar to Browns Island, improvement, I, 1261; II, 2862
  - Muscle Shoals Canal, operating and care, I, 1290; II, 2880
  - Muscle Shoals Nitrate Plants, I, 1287; II, 2879
- Tensas River, La., improvement, I, 1097; II, 2685
- Terra Ceia Cut-Off, Fla., improvement, I, 801; II, 2473
- Terrebonne Bayou, La.:
  - Examination and survey, I, 986
  - Improvement, I, 939; II, 2590
- Texas City Harbor, Tex.:
  - Examination and survey, I, 1056
  - Improvement of channel to Galveston, I, 996; II, 2628
- Texas, State, removal of water hyacinths, I, 983; II, 2619
- Thames River, Conn.:
  - Improvement, I, 187; II, 2074
  - Improvement of New London Harbor, I, 184; II, 2072
- The Board of Engineers, I, 33
- Thimble Shoal, Chesapeake Bay, Va., improvement, I, 543; II, 2316
- Thomaston Harbor, Me., improvement, I, 91; II, 2009
- Threemile Rapids, Columbia River, Oreg. and Wash., improvement, I, 1748; III, 3366
- Thunder Bay Harbor and River, Mich.:
  - Examinations and surveys, I, 1572
  - Improvement, I, 1554; II, 3246
- Tickfaw River, La., improvement of, including tributaries, I, 930; II, 2585
- Tigre Bayou, La., examination and survey, I, 986
- Tilghman Island Harbor, Md., improvement, I, 476; II, 2268
- Tillamook Bay and Bar, Oreg.:
  - Examinations and surveys, I, 1762
  - Improvement, I, 1737; III, 3360
- Toledo Harbor, Ohio:
  - Examination for waterway to Lake Michigan, I, 1608
  - Improvement, I, 1572; II, 3259
- Tolovano River, Alaska, examination and survey, I, 1838
- Tombigbee River, Ala. and Miss.:
  - Demopolis, Ala., improvement below (construction of locks and dams), I, 872; II, 2526
  - Demopolis, Ala., improvement below (maintenance), I, 878; II, 2528
  - Demopolis, Ala., to Walkers Bridge, Miss., improvement, I, 881; II, 2531
  - Operating and care of locks and dams, I, 885; II, 2533
- Toms River, N. J., improvement, I, 428; II, 2239
- Tonawanda Harbor, N. Y., improvement, I, 1621; II, 3290
- Towboats, experimental, for use on Mississippi River, I, 1873; III, 3455
- Town Creek Channel, S. C., examination and survey, I, 677
- Trail Creek, Michigan City Harbor, Ind., improvement, I, 1466; II, 3144
- Training camps, Engineer officers', I, 28
- Transportation Corps, Railway, National Army, I, 15
- Traps, fish, permits for construction, I, 1886
- Traverse Lake, Minn. and S. Dak., improvement, I, 1201; II, 2789
- Tred Avon River, Md., improvement, I, 477; II, 2268
- Trent River, N. C.:
  - Examination, I, 647
  - Improvement, I, 607; II, 2354
- Trinity River, Tex.:
  - Examination for flood control, I, 1087
  - Improvement above mouth, I, 1069; II, 2667
  - Improvement of mouth, I, 1014; II, 2637
  - Operating and care of locks and dams, section 1, I, 1074; II, 2668

Troops: Page.
  Distribution and commissioned strength I, 6
  Engineer, equipment of I, 71
  Gas Defense and Tank Service I, 14
  Mobilization camps I, 17
  National Army I, 11, 12
  National Guard Organizations I, 7
  Recruiting I, 30
  Reorganization of regiments and battalions I, 6
  Replacement of casualties I, 32
  Training I, 31
Troy lock and dam, Hudson River, N. Y., operating and care I, 273; II, 2136
Tuckahoe River, Md., improvement I, 482; II, 2272
Tuckerton Creek, N. J., improvement I, 426; II, 2239
Tugaloo River, Ga., examination I, 730
Tug Fork, Big Sandy River, W. Va. and Ky.:
  Improvement I, 1349; II, 3061
  Operating and care of locks and dams I, 1353; II, 3063
Turners Cut, N. C., improvement of waterway via I, 567; II, 2327
Turtle Bayou, Tex., improvement I, 1015; II, 2637
Turtle Cove Channel, Port Aransas, Tex., examination and survey I, 1056
Turtle Cove, Tex., improvement of waterway via I, 1042; II, 2647
Turtle River, Brunswick Harbor, Ga., improvement I, 724; II, 2423
Twelvemile Bayou, La., improvement of waterway via I, 1082; II, 2675
Twitch Cove and Big Thoroughfare River, Md., improvement I, 504; II, 2285
Two Rivers Harbor, Wis., improvement I, 1420; II, 3114
Tyaskin (Wetipquin) Creek, Md., improvement I, 493; II, 2278

U.

Umpqua River, Oreg., examination and survey of bar and entrance I, 1761
Union Lake, Wash., improvement of waterway via I, 1815; III, 3416
Upper Chipola River, Fla., improvement I, 821; II, 2484
Upper White River, Ark., operation of locks and dams I, 1151; II, 2721
Urbanna Creek, Va., improvement I, 526; II, 2299

V.

Valley Creek, Ala., examination and survey I, 910
Vancouver Barracks, engineer depot I, 69
Vermilion Bay and River, La., improvement of waterway via I, 958; II, 2604
Vermilion Bayou, La.:
  Examination I, 986
  Improvement of channel, bay, and passes I, 969; II, 2611
Vermilion, Clay County, S. Dak., bank revetment on Missouri River at I, 1226; II, 2883
Vermilion Harbor, Ohio, improvement I, 1585; II, 3266
Vicksburg, Miss., engineering district I, 1087; II, 2677
Victoria, Tex., improvement of channel to Aransas Pass I, 1035; II, 2645
Virginia coast waterway improvement I, 457; II, 2254
Volusia Bar, St. Johns River, Fla., improvement I, 741; II, 2436

W.

Wabash River, Ind. and Ill., operating and care of lock and dam I, 1337; II, 3033
Waccamaw River, N. C. and S. C., improvement I, 651; II, 2390
Wakefield, Va., monument and wharf at I, 1942; III, 3800
Wallabout Channel, N. Y., improvement I, 313; II, 2159
Wappinger Creek, N. Y., improvement I, 279; II, 2142
War Department maps I, 60
Warrior River, Ala.:
  Examination and survey of Mulberry Fork I, 910
  Improvement I, 872; II, 2526
  Operating and care of locks and dams on Black Warrior River I, 885; II, 2533
Warroad Harbor and River, Minn., improvement I, 1205; II, 2790

Page.

- Warwick River, Md., improvement ---- i, 484; ii, 2272
- Washington Barracks, D. C.:
  - Engineer depot ---- i, 63
  - Engineer post and school, buildings ---- i, 75
  - Engineer School ---- i, 75
- Washington Bayou and Lake, Miss., improvement ---- i, 1122; ii, 2703
- Washington, D. C.:
  - Anacostia River, reclamation of flats ---- i, 1904; iii, 3755
  - Aqueduct Bridge across Potomac River, repair ---- i, 1909
  - Aqueduct, filtration plant ---- i, 1916; iii, 3759
  - Aqueduct, maintenance and repair ---- i, 1916; iii, 3759
  - Defenses ---- i, 34
  - Engineer depot ---- i, 63
  - Engineering district ---- i, 507; ii, 2287
  - Engineer post and school, buildings ---- i, 75
  - Engineer School ---- i, 75
  - Executive Mansion and Office ---- i, 1924; iii, 3773
  - Highway Bridge, Potomac River ---- i, 1922; iii, 3799
  - Improvement of Anacostia River at ---- i, 511; ii, 2290
  - Improvement of Potomac River at ---- i, 507; ii, 2287
  - Key Bridge, Potomac River ---- i, 1912
  - Public buildings and grounds, and Washington Monument ---- i, 1922; iii, 3773
  - Telegraph line connecting executive departments ---- i, 1940; iii, 3799
  - Water supply, increase ---- i, 1916; iii, 3759
- Washington, George, monument to, at Washington, D. C ---- i, 1922; iii, 3773
- Washington Lake, Miss., improvement ---- i, 1122; ii, 2703
- Washington Lake, Wash.:
  - Improvement of waterway to Puget Sound ---- i, 1815; iii, 3416
  - Operating and care of waterway to Puget Sound ---- i, 1831; iii, 3429
- Washita (Ouachita) River, Ark. and La.:
  - Improvement ---- i, 1091; ii, 2680
  - Operating and care of locks and dams ---- i, 1108; ii, 2692
- Washougal Slough, Wash., examination and survey ---- i, 1762
- Wateree River, S. C., improvement ---- i, 661; ii, 2396
- Water hyacinths, removal of:
  - From Alabama, Mississippi, Louisiana, and Texas waters ---- i, 983; ii, 2619
  - From Florida waters ---- i, 807; ii, 2476
- Water levels:
  - Mississippi River and principal tributaries, gaging ---- i, 1196; ii, 2786
  - Northern and northwestern lakes, levels, etc ---- i, 1956; iii, 3809
- Water meters, installation in certain Government buildings ---- i, 1918; iii, 3759
- Water power:
  - Black Warrior River, Ala., at Dam 17 ---- i, 872; ii, 2526
  - Mississippi River, dam between Minneapolis and St. Paul, Minn., i, 1182; ii, 2781
  - Niagara River, N. Y., control and regulation of ---- i, 1969; iii, 3821
  - Tennessee River, Elk River Shoals to Florence, Ala ---- i, 1290; ii, 2880
- Waters, navigable. *See* Bridges, Rivers and harbors, *and* Wrecks.
- Water supply, Washington, D. C ---- i, 1916; iii, 3759
- Waterways:
  - *See also* Canals.
  - Beaufort, N. C., to New River, improvement ---- i, 619; ii, 2364
  - Beaufort, S. C., to St. Johns River, Fla., improvement ---- i, 693; ii, 2412
  - Beaufort to Jacksonville, N. C., improvement ---- i, 619; ii, 2364
  - Buzzards Bay to Cape Cod Bay, examination and survey ---- i, 177
  - Calcasieu River to Sabine River, Tex. and La., examination ---- i, 986
  - Charleston to McClellanville, S. C., improvement ---- i, 667; ii, 2399
  - Clearwater Bay to Boca Ceiga Bay, Fla., improvement ---- i, 779; ii, 2459
  - Core Sound to Beaufort Harbor, improvement ---- i, 617; ii, 2362
  - Delaware Bay, Del., to Chincoteague Bay, Va., improvement ---- i, 455; ii, 2253
  - Delaware Bay to Rehoboth, Del., improvement ---- i, 452; ii, 2251
  - Flint River to Ocmulgee River, Ga., examination and survey ---- i, 731
  - Galveston to Corpus Christi, improvement ---- i, 1030; ii, 2642
  - Galveston to Houston, Tex., improvement ---- i, 1002; ii, 2631
  - Keweenaw Bay to Lake Superior, Mich., improvement ---- i, 1378; ii, 3088

Waterways—Continued.
Mississippi River to Sabine River— Page.
Franklin, La., to Mermentau River, improvement---- I, 958; II, 2604
Mermentau River to Sabine River, La., improvement---- I, 961; II, 2606
Operating and care of Schooner Bayou Lock---- I, 968; II, 2609
New Jersey coast waterway, Cape May to New York Bay, N. Y. and N. J., examination---- I, 459
New River, N. C., to Swansboro and Beaufort, improvement-- I, 619; II, 2364
Norfolk, Va., to Beaufort Inlet, N. C.—
Improvement---- I, 569; II, 2329
Operating and care---- I, 574; II, 2331
Norfolk, Va., to sounds of North Carolina, improvement---- I, 567; II, 2327
Pamlico Sound, N. C., to Beaufort Inlet, improvement---- I, 611; II, 2357
Port Townsend Bay to Oak Bay, Wash.—
Examination---- I, 1838
Improvement---- I, 1808; III, 3408
Puget Sound to Lake Washington—
Improvement---- I, 1815; III, 3416
Operating and care---- I, 1831; III, 3429
Savannah, Ga., to Beaufort, S. C., improvement---- I, 693; II, 2412
Savannah, Ga., to Fernandina, Fla., improvement---- I, 696; II, 2413
Swan Quarter Bay to Deep Bay, N. C., improvement---- I, 587; II, 2341
Texas, from Sabine Pass through Port Arthur ship canal and through Sabine-Neches Canal, examination and survey---- I, 1087
Virginia coast waterway, improvement---- I, 457; II, 2254
Waukegan Harbor, Ill., improvement---- I, 1443; II, 3172
Weirs, permits for construction---- I, 1886
Welland Canal, report on connecting waters of Great Lakes---- I, 1654
Wenona, Deal Island, Md., improvement of Lower Thoroughfare at---- I, 498; II, 2281
Westchester Creek, N. Y., improvement---- I, 241; II, 2102
Western Branch, Elizabeth River, Va., improvement---- I, 538; II, 2309
West Galveston Bay and Brazos River Canal, Tex., improvement---- I, 1030; II, 2642
Westport Harbor, Conn., improvement---- I, 217; II, 2088
West River, Conn., improvement---- I, 200; II, 2079
Wetipquin (Tyaskin) Creek, Md., improvement---- I, 493; II, 2278
Weymouth Back River, Mass---- I, 142; II, 2045
Weymouth Fore River, Mass---- I, 138; II, 2043
Wharves, permits for construction---- I, 1868
Whatcom (Bellingham) Harbor, Wash., improvement of Whatcom Creek waterway---- I, 1826; III, 3427
Wheeling, W. Va., engineering district---- I, 1326; II, 3005
Whitehall Harbor, N. Y., Narrows of Lake Champlain, improvement---- I, 287; II, 2146
White House, Washington, D. C---- I, 1924; III, 3773
White Lake Harbor, Mich., improvement---- I, 1503; II, 3176
White River, Ark.:
Examination and survey---- I, 1154
Improvement at Devall Bluff---- I, 1138; II, 2713
Improvement by open-channel work---- I, 1134; II, 2711
Operating and care of locks and dams---- I, 1151; II, 2721
Whites Creek, Tenn., examination at mouth---- I, 1296
Wicomico River, Md., improvement---- I, 494; II, 2279
Willamette River, Oreg.:
Examination and survey---- I, 1794
Improvement above Portland---- I, 1775; III, 3390
Improvement at the falls---- I, 1780; III, 3393
Improvement below Portland---- I, 1766; III, 3381
Operating and care of canal and locks at Willamette Falls-- I, 1791; III, 3399
Willamette Slough, Oreg., examination and survey---- I, 1794
Willapa Harbor and River, Wash., improvement---- I, 1795; III, 3403
Willis River, Va., examination---- I, 582
Wilmington, Cal., improvement of inner harbor---- I, 1660; III, 3319
Wilmington, Del., engineering district---- I, 400; II, 2225
Wilmington Harbor, Del., improvement---- I, 432; II, 2240

Page.

- Wilmington, N. C., engineering district — i, 582; ii, 2337
- Winnebago Lake, Wis., improvement of Fox River — i, 1404; ii, 3105
- Winnibigoshish Reservoir, Minn.:
  - Construction — i, 1191; ii, 2785
  - Operating and care — i, 1196; ii, 2786
- Winyah Bay, S. C.:
  - Examination and survey — i, 677
  - Improvement — i, 648; ii, 2387
- Wisconsin River, Wis., operating snag and dredge boats — i, 1173; ii, 2774
- Withlacoochee River, Fla.:
  - Examination and survey — i, 812
  - Improvement — i, 785; ii, 2463
- Wolf River, Miss., improvement — i, 902; ii, 2550
- Wolf River (tributary of the Fox), Wis., improvement — i, 1404; ii, 3105
- Women of Civil War, memorial to — i, 1943; iii, 3802
- Woodbridge Creek, N. J., improvement — i, 354; ii, 2187
- Woodbury Creek, N. J., improvement — i, 402; ii, 2226
- Wrecks, etc., removal:
  - Expenditures during the year — i, 77
  - List of those removed — i, 1888
  - Permanent appropriation for — i, 76

Y.

- Yamhill River, Oreg.:
  - Improvement — i, 1775; iii, 3390
  - Operating and care of lock and dam — i, 1792; iii, 3400
- Yaquina River, Oreg., improvement — i, 1734; iii, 3360
- Yazoo River, Miss.:
  - Improvement above mouth — i, 1109; ii, 2694
  - Improvement of mouth, including Vicksburg Harbor — i, 1124; ii, 2704
- Yellow Mill Pond, Bridgeport, Conn., improvement — i, 211; ii, 2085
- Yellowstone National Park, improvement — i, 1972; iii, 3827
- York River, Va., examination of channel to Back Creek — i, 537
- York Spit, Chesapeake Bay, Va., shoals opposite, removal — i, 460; ii, 2255
- Youghiogheny River, Pa.:
  - Examination and survey — i, 1326
  - Improvement — i, 1324; ii, 3002
- Youngs Bay, Oreg., examination and survey — i, 1794
- Yuba River, Cal., construction of restraining dams — i, 1856; iii, 3449
- Yukon River, Alaska, improvement of Apoon mouth — i, 1833; iii, 3431

Z.

- Zippel Bay, Minn., improvement — i, 1207; ii, 2791

O

MAR 14 1919